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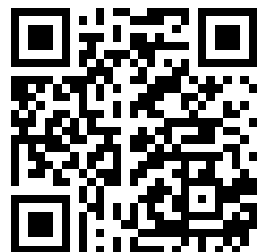


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Oil Well

3 VHY

777-1

ILLUSTRATED CATALOGUE

OF THE

OIL WELL SUPPLY CO.,

PITTSBURGH, PA.

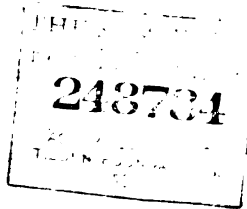
ALSO

BRADFORD, OIL CITY, PA.,

AND

NEW YORK CITY, U. S. A.

NEW YORK
PUBLIC
LIBRARY



COPYRIGHTED BY
THE OIL WELL SUPPLY COMPANY,
1892.

E. P. COBY & CO.,
PRINTERS,
21 PLATT STREET,
NEW YORK.

Or

JOHN EATON, PRES.
E. T. HOWES, TREAS.
K. CHICKERING, SEC.
K. SAULNIER, ASST. TREAS.

American Agricult
More Orange Judd

Gentlemen,

enclosed, with the ha

ILLUSTRATIONS.

The First Oil Well and Modern Oil Well,

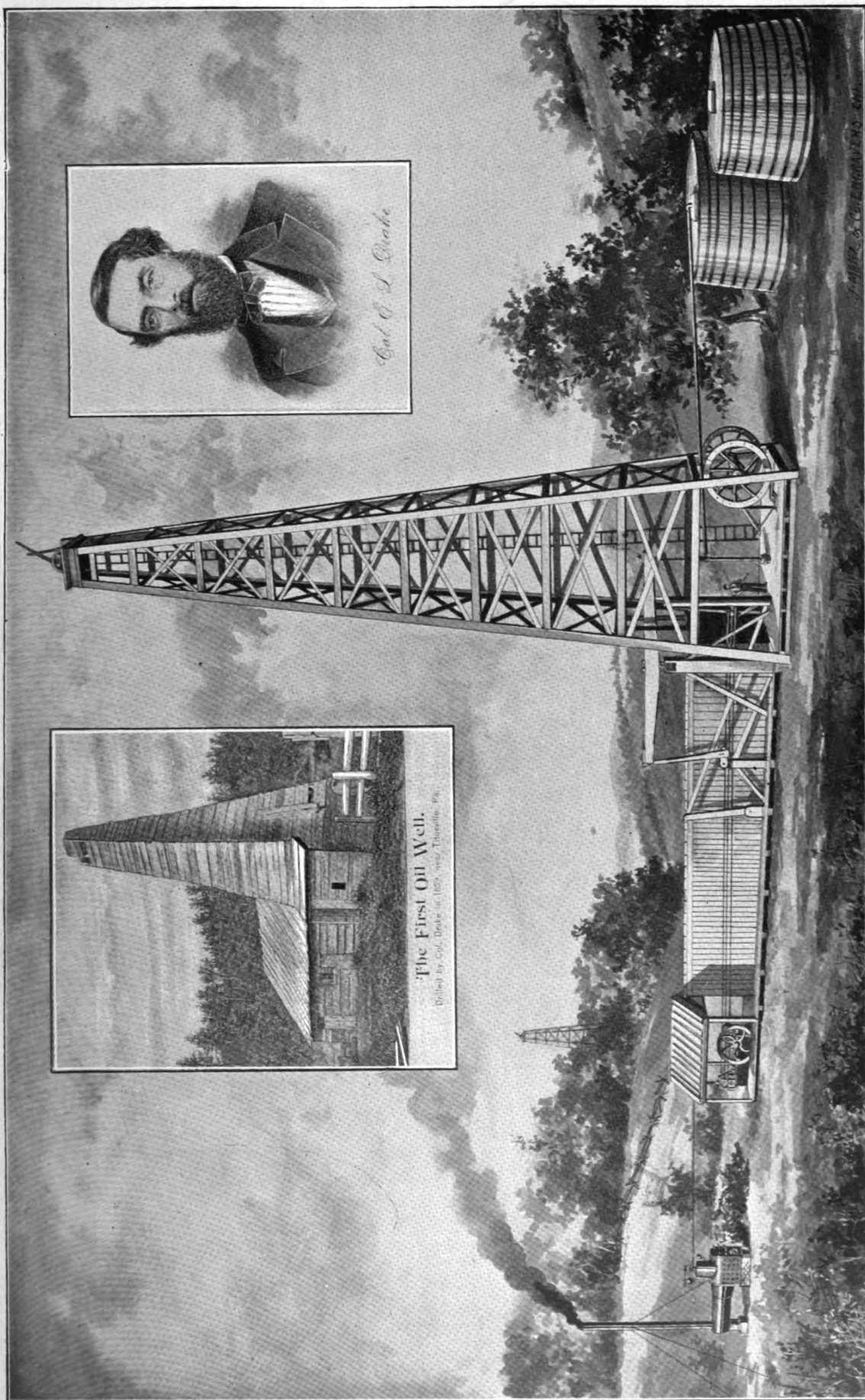
1859 "The Old" and "The New" 1892.

Store and General Office,	- - -	}	Pittsburgh, Pa.
Machine and Blacksmith Shop and Warehouses,			
Store, Machine, Blacksmith and Drop Forge Works,		}	Oil City, Pa.
Engine Works,	- - - - -		
Store,	- - - - -	}	Bradford, Pa.
Machine and Blacksmith Shops,	- - -		
Sand Reel Shop and Rig Factory,	- -		
Saw Mill and Sucker Rod Factory,	- -		Van Wert, Ohio.
Works :—The Eaton Cole & Burnham Co.,	-		Bridgeport, Conn.
Iron Mill and Pipe Works,	- - - -		Pittsburgh, Pa.

1859.

"THE OLD" AND "THE NEW."

1892.



THE FIRST OIL WELL,

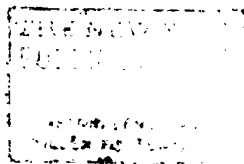
HEIGHT OF DERRICK, 34 FEET.

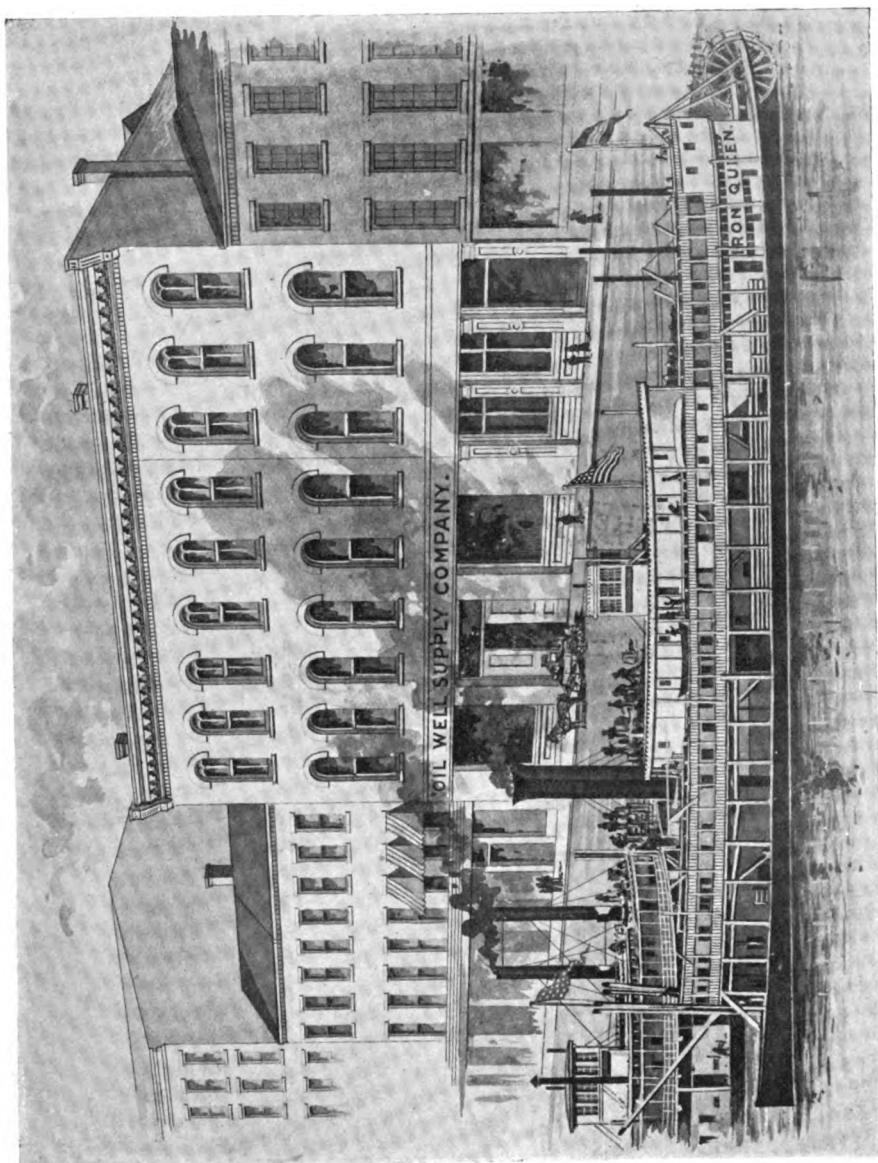
MODERN OIL WELL,

HEIGHT OF DERRICK, 82 FEET.

BOTH DERRICKS DRAWN TO THE SAME SCALE.

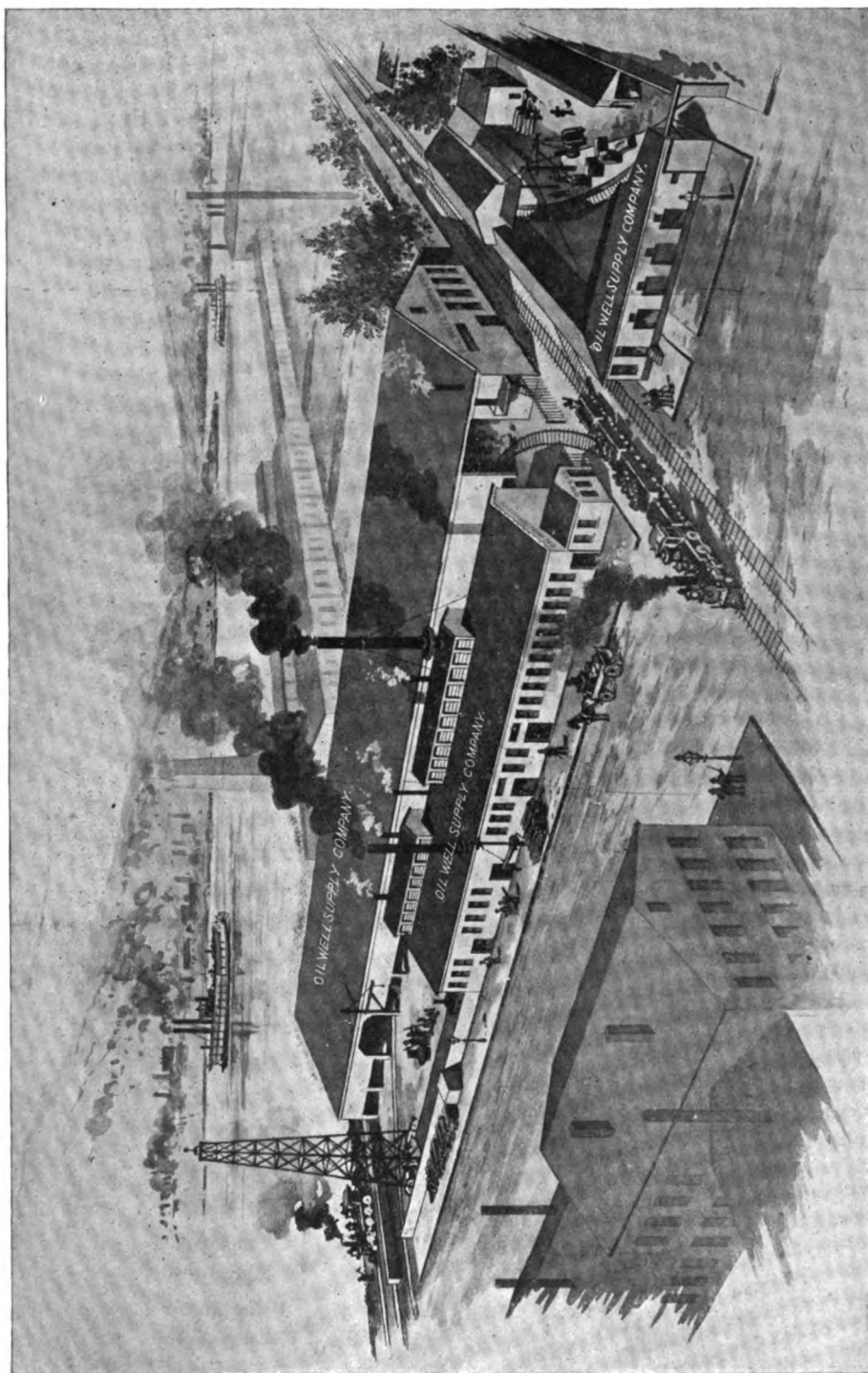
Copyright 1891 by the Oil Well Supply Co.





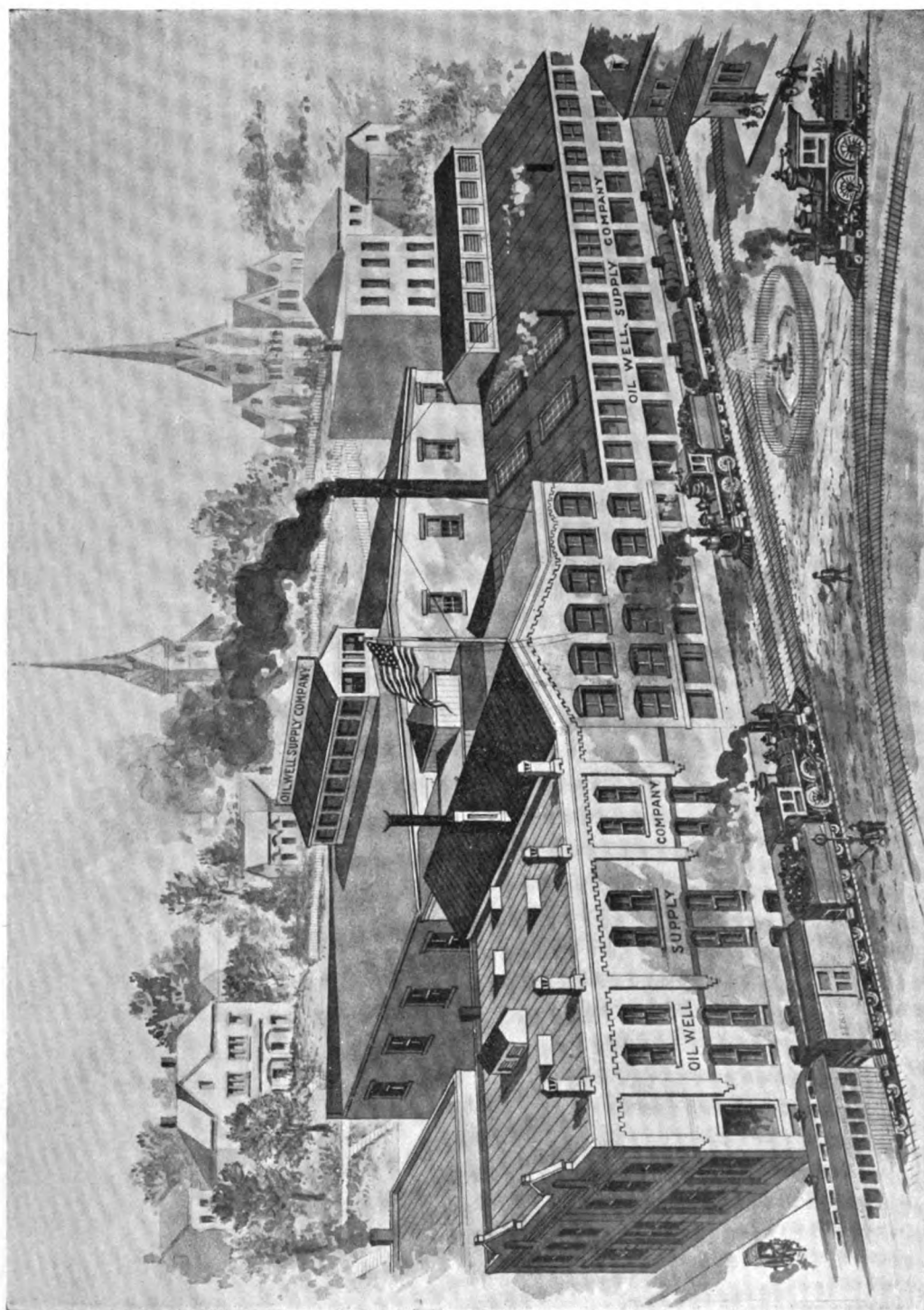
STORE AND GENERAL OFFICE, 91 & 92 WATER STREET,
PITTSBURGH, PA.

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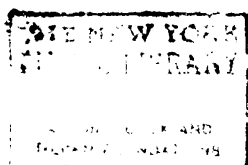
MACHINE SHOP AND WAREHOUSES,
21ST STREET FROM RAILROAD AVENUE TO ALLEGHENY RIVER,
PITTSBURGH, PA.
CONNECTED AT ONE END WITH THE R. R. TRACKS OF THE PENNSYLVANIA SYSTEM, AND AT THE OTHER WITH
BALTIMORE AND OHIO AND ITS ALLIES.

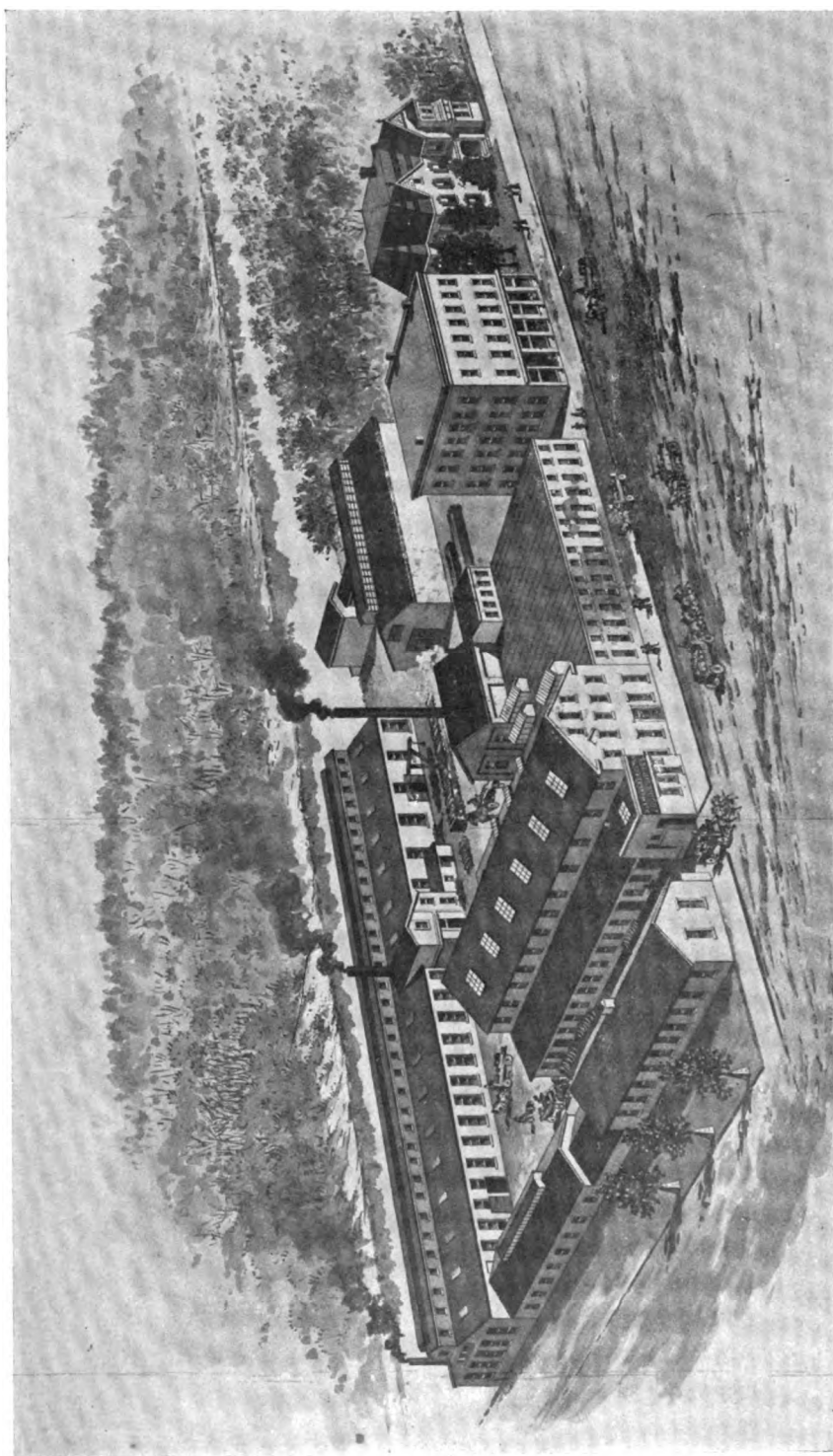
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OIL CITY, PA., STORE, MACHINE, BLACKSMITH AND DROP FORGE WORKS, OPPOSITE UNION RAIL ROAD STATION.

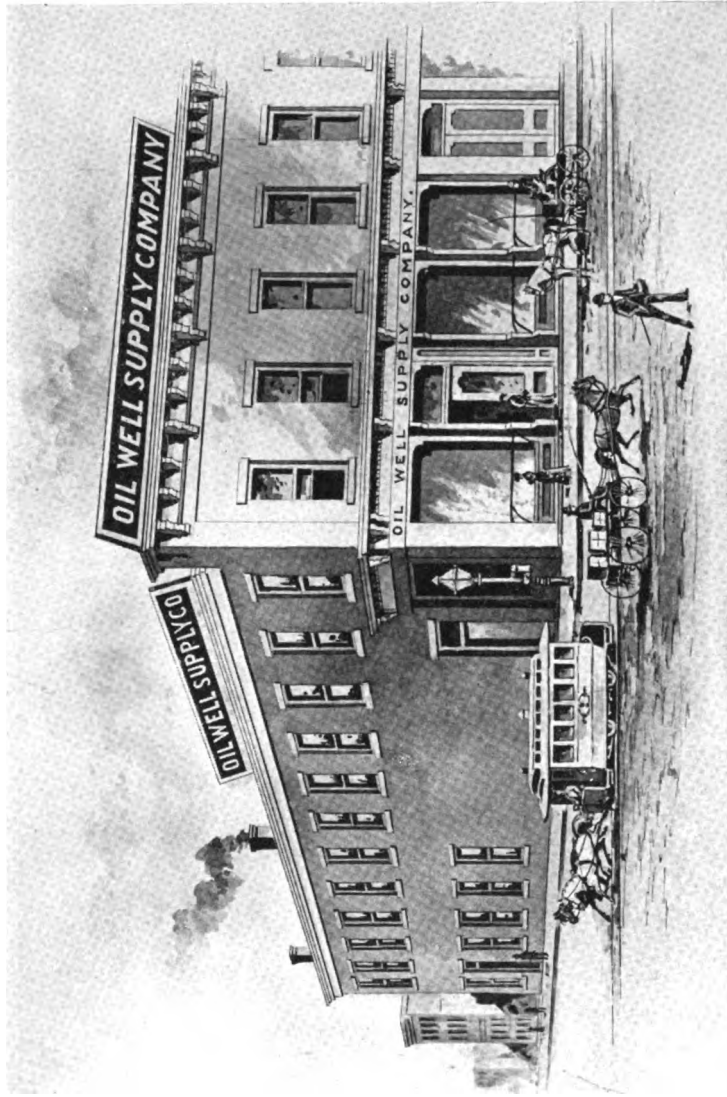
(NO SMOKE ISSUES NOW FROM THE STACK, AS WE HAVE OUR OWN GAS LINE, $7\frac{1}{2}$ MILES LONG, WITH 1,200 ACRES OF RICH GAS TERRITORY, ENSURING THE BEST AND CHEAPEST FUEL FOR MANY YEARS).



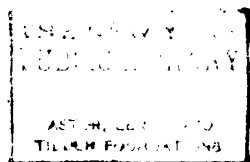


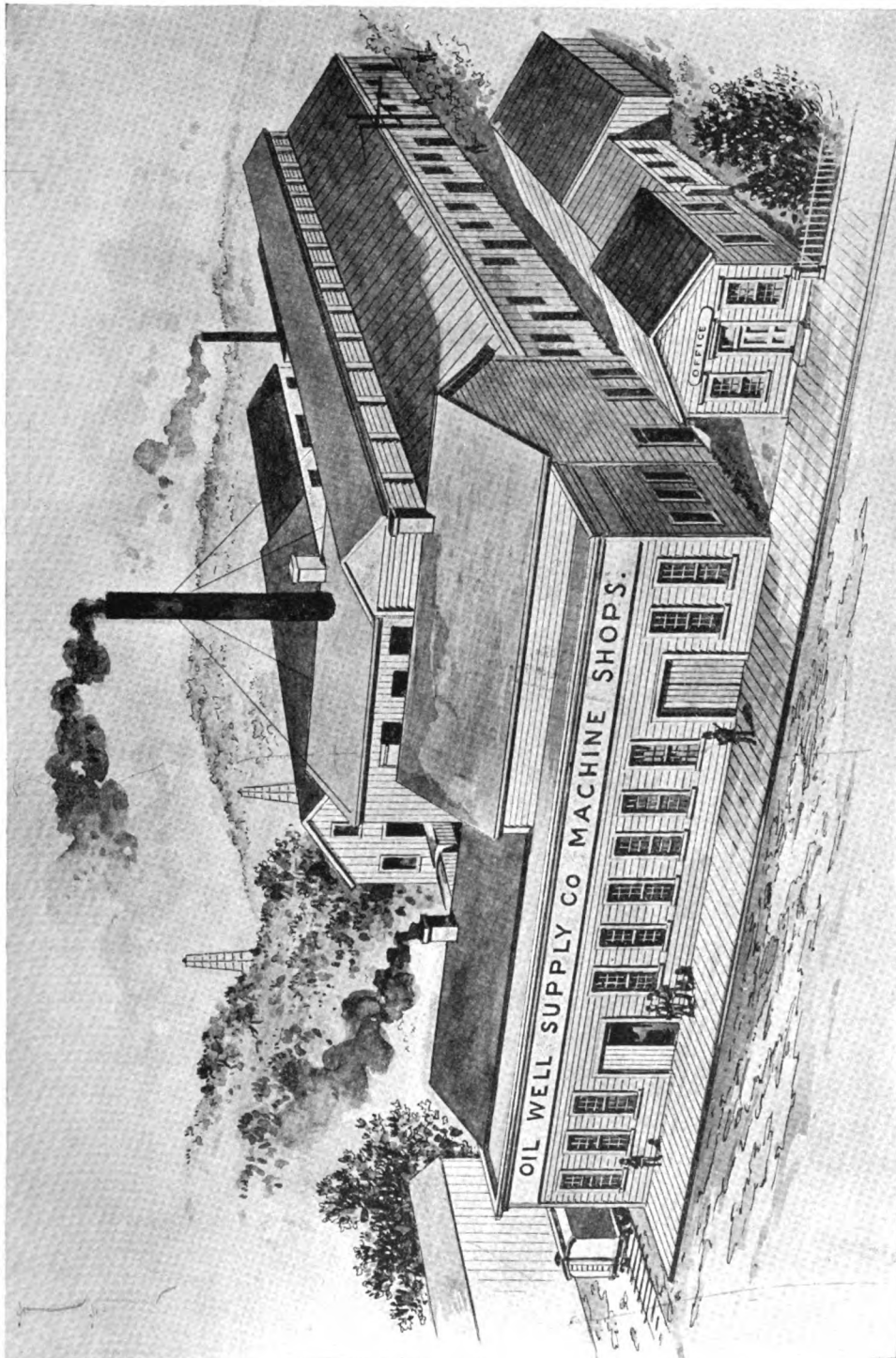
ENGINE WORKS.
NORTH SENECA STREET, OIL CITY, PA.
FUEL, NATURAL GAS.

THE NEW YORK
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ASTOR LENOX TILDEN FOUNDATION
125 WEST 47TH STREET
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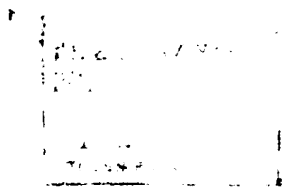


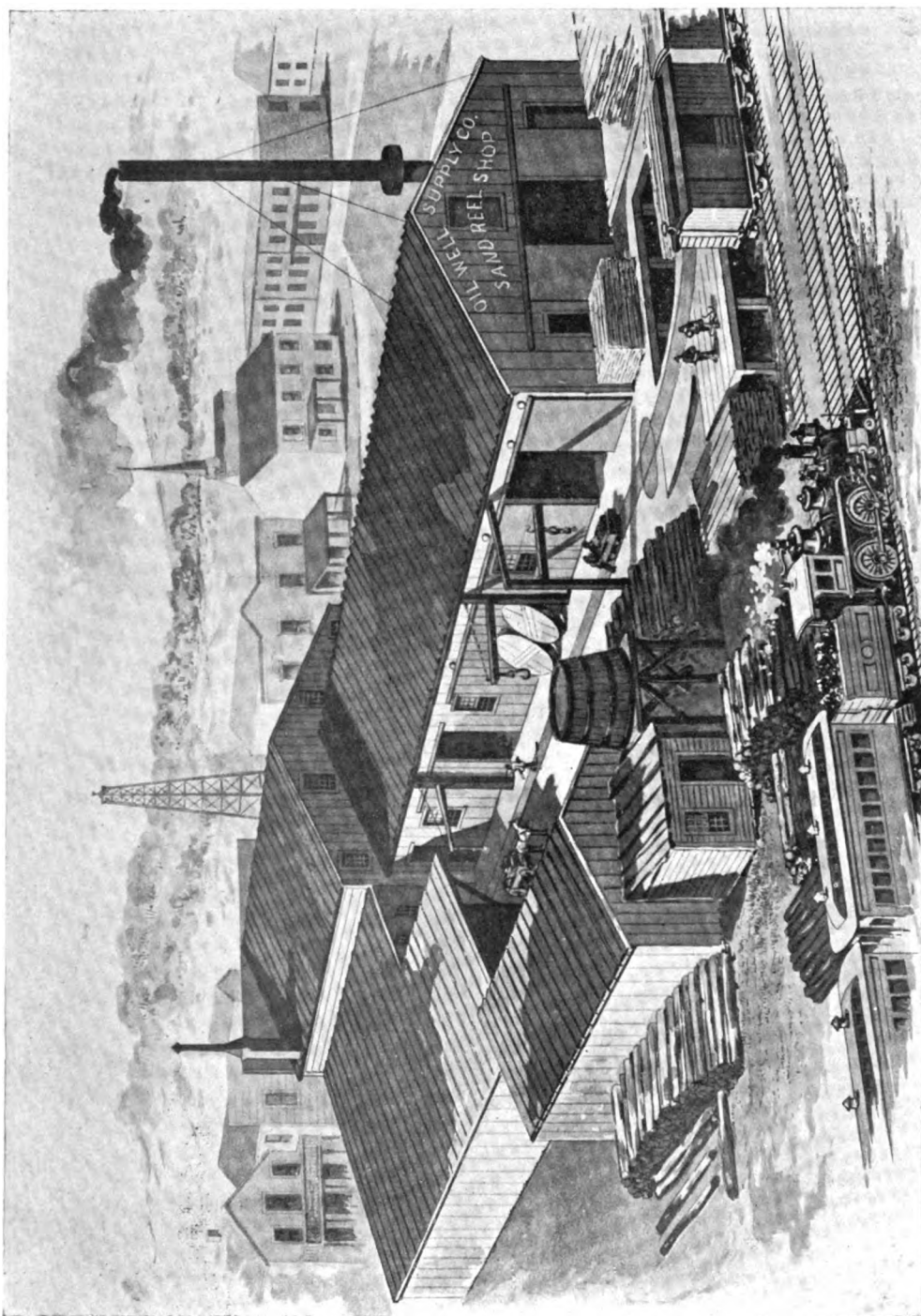
STORE AT BRADFORD, PA.



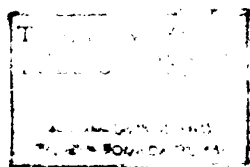


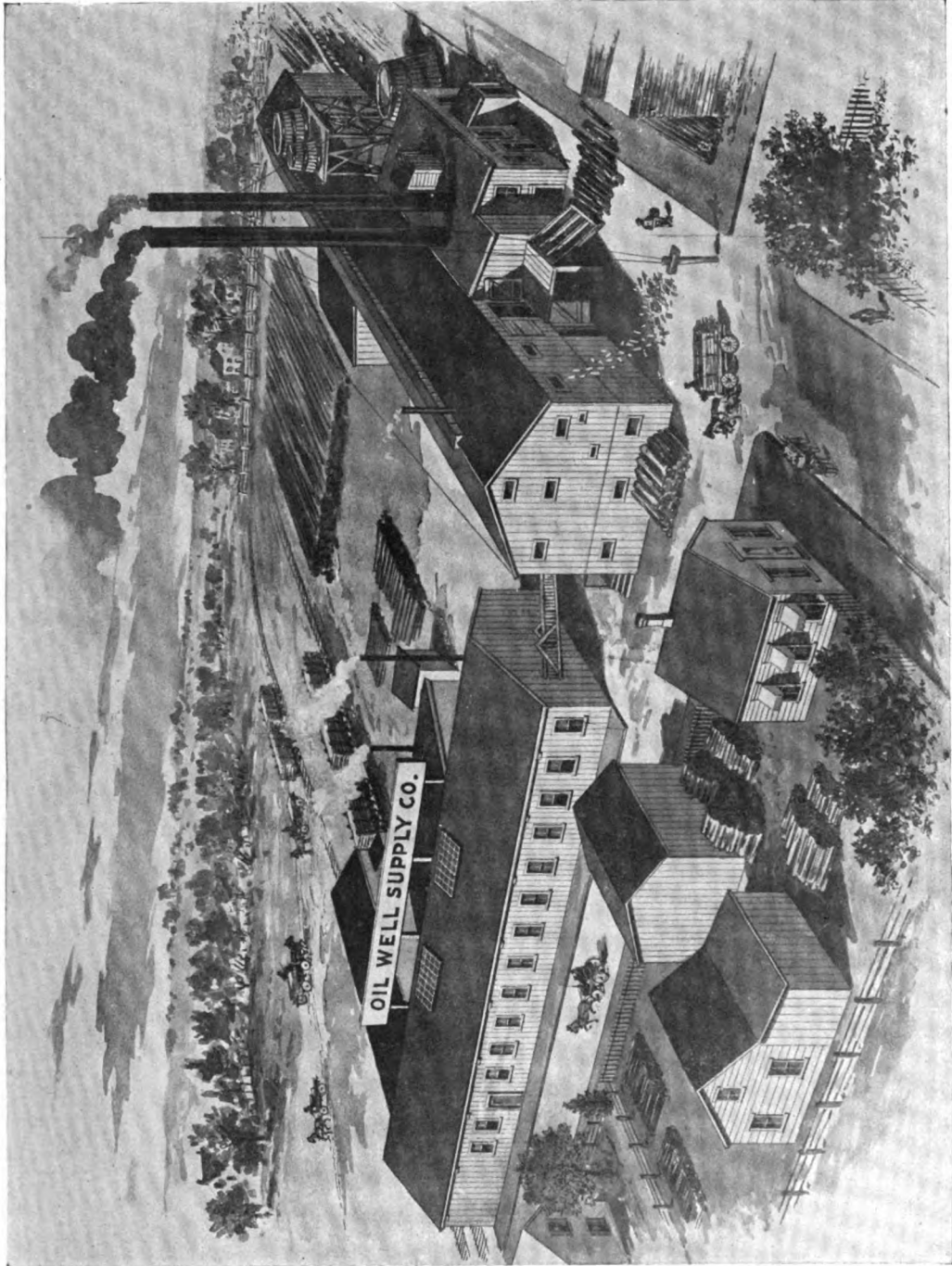
MACHINE AND BLACKSMITH SHOPS.
BRADFORD, PA.





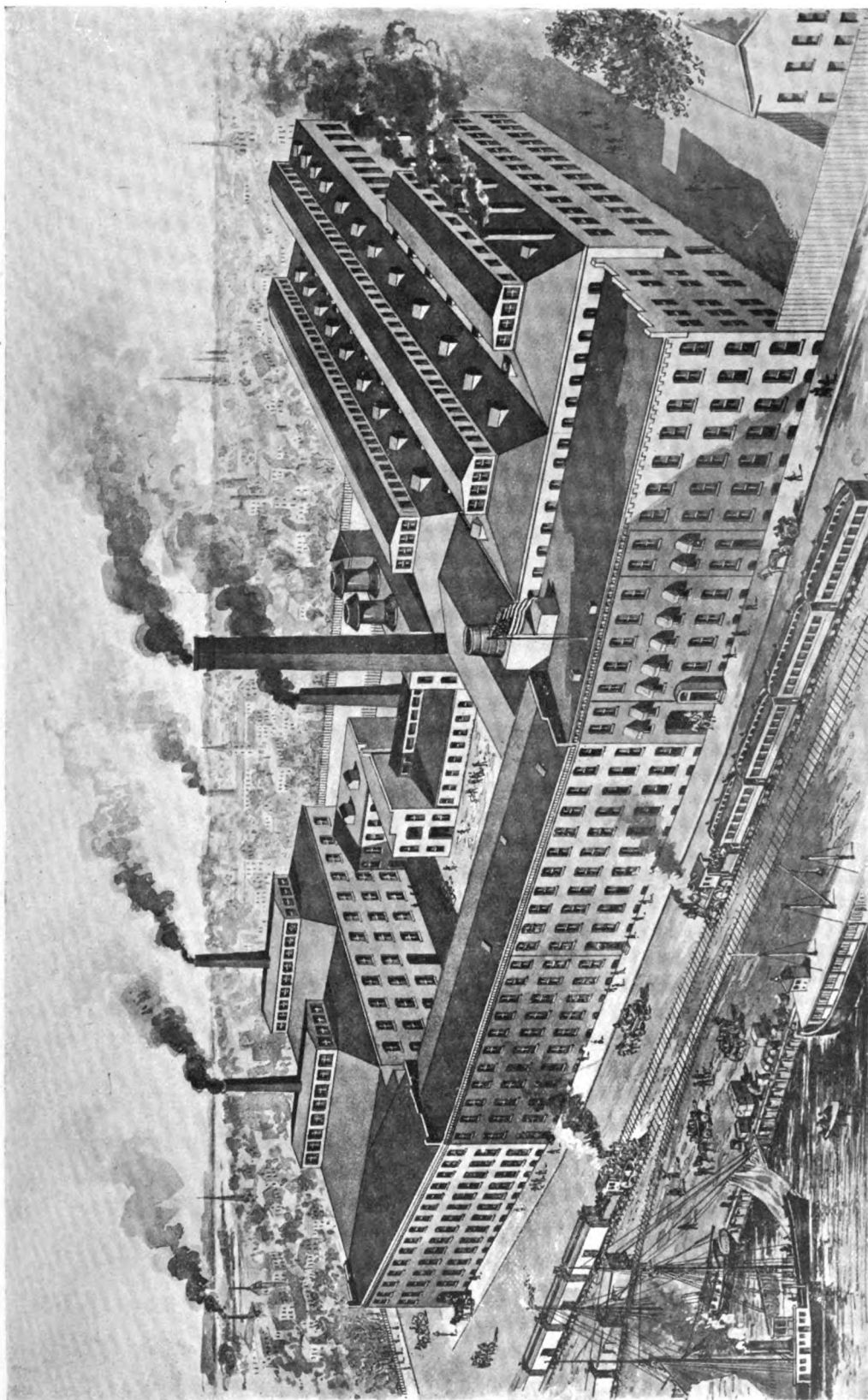
SAND REEL SHOP AND RIG FACTORY.
BRADFORD, PA.





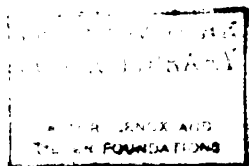
SAW MILL AND SUCKER ROD FACTORY,
VAN WERT, OHIO.

1
The new features of the
new edition of the book

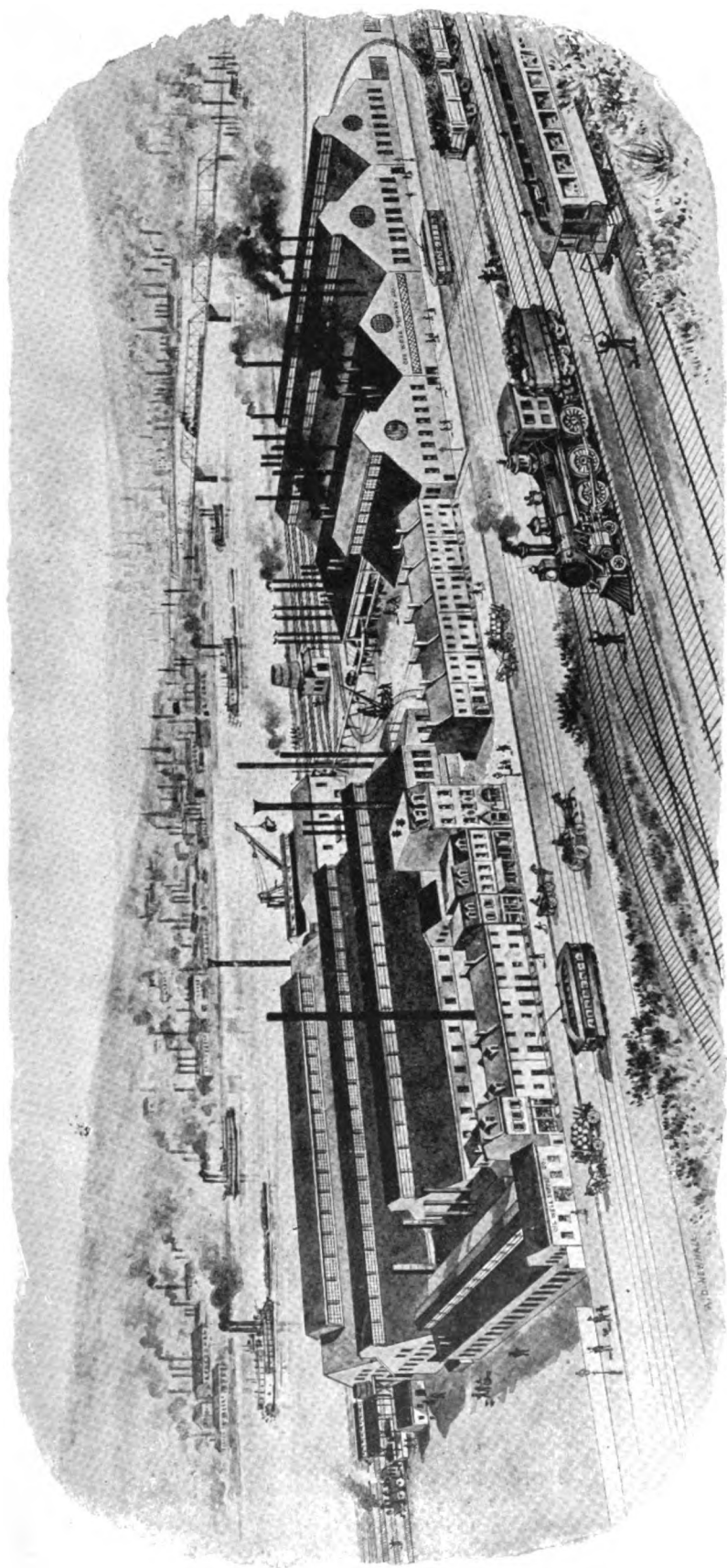


THE PRINCIPAL OWNERS OF THE STOCK OF THE
OIL WELL SUPPLY COMPANY,
ARE ALSO THE PRINCIPAL OWNERS OF THE STOCK OF
THE FAYON, COLE & BURNHAM COMPANY.

WORKS OF
THE EATON, COLE & BURNHAM COMPANY,
BRIDGEPORT, CONN.



IRON MILL AND PIPE WORKS, PITTSBURGH, PENNA.



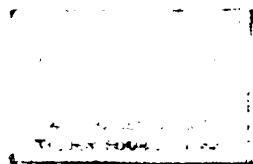
CONTINENTAL TUBE WORKS.

Located on the MONONGAHELA RIVER.

ABOUT THREE MILES FROM POST OFFICE.

BUILDINGS 2,600 FEET IN LENGTH. PROPERTY COVERS NEARLY 13 ACRES OF GROUND, AND IS 1,300 FEET LONG, ON RIVER AND RAILROADS. 13 RAILROADS ENTERING PROPERTY. STEAMERS PLYING ON THE OHIO, MONONGAHELA AND ALLEGHENY RIVERS LAND AT THE LEVEE. 1,500 WORKMEN EMPLOYED.

ELBA IRON WORKS.



OFFICE OF THE

OIL WELL SUPPLY COMPANY,

PITTSBURGH, PENNSYLVANIA, U. S. A.

In presenting the second edition of the only fully Illustrated Catalogue of Artesian Well Supplies ever published, we desire to state that since the publication of the first edition, we have greatly enlarged our facilities. We now have ten separate fully equipped manufactories in which we employ nearly 3,000 people, so that we can ourselves make everything required to equip, drill and operate Artesian Wells for Oil, Gas, Water or Minerals. We carry large stocks of goods, and all orders can be filled promptly.

We present illustrations of our principal factories, and of some of our many stores and warehouses. They show for themselves the abundance of our facilities and the magnitude of our business.

Our principal office is at 91 & 92 Water Street, Pittsburgh, Pennsylvania.

We have large establishments at Bradford and Oil City, Pennsylvania, and at 32 Cortlandt Street, New York, and more than 20 Branch Stores in different parts of the Oil Regions.

We have been engaged in the business since 1862.

This catalogue with price list and discount sheet will be furnished on application to either of our stores or offices.

JOHN EATON, President,	- - - -	Pittsburgh, Pa.
E. H. COLE, Vice-President,	- - - -	New York, N. Y.
E. G. BURNHAM, Director,	- - - -	Bridgeport, Conn.
K. CHICKERING, Secretary,	- - - -	Oil City, Pa.
E. T. HOWES, Treasurer,	- - - -	Bradford, Pa.
K. SAULNIER, 1st Ass't Treasurer,	- - - -	Bradford, Pa.
LOUIS BROWN, 2nd Ass't Treasurer,	- - - -	Pittsburgh, Pa.

The process of obtaining water, and of testing lands for minerals by sinking wells of small diameter, has been practiced for many hundred years.

In Europe it was first employed in the Province of Artois, in the North of France, whence the name "Artesian" is derived. Within the gardens of a former Dominican Convent, at Lillers, in Artois, there is a deep well which has flowed continuously since the year 1126, and unmistakable traces of much more ancient ones are found in various countries,

Formerly it was a very difficult, tedious and expensive operation to drill a deep well, but now one can be sunk two thousand feet at a tenth of the cost, and in less than a tenth of the time that was once required.

The modern method is an adaption of steam power to the method practiced for ages in China.

Free falling tools, suspended by a cable and worked by steam power are used, the weight of the tools being so great as to give blows of sufficient force to pierce the hardest rock.

In the Oil Regions of Pennsylvania and vicinity there have been sunk many more Artesian Wells than in all other parts of the world together, and great industries have been created for manufacturing the apparatus and tools to sink wells to great depths.

The first well drilled for the express purpose of obtaining oil was sunk near Titusville, in the State of Pennsylvania, by Col. E. L. Drake, in 1859, since which time more than 60,000 wells have been drilled in Pennsylvania and adjoining States.

Our first illustration is a picture of Col. E. L. Drake and the derrick used at the "First Well," contrasted with one used at the present day (both derricks are drawn to the same scale). With the first derrick the well was drilled 69½ feet; with the other, a well has been drilled 4,618 feet. In no way can the changes and improvements since 1859 be more graphically shown.

IN our first edition we described the method of sinking Artesian Wells and the uses of the various tools, but as skillful and experienced workmen are essential for successful operations, printed instructions for the use of tools would be of no practical value.

The operation of drilling Artesian Wells is substantially the same everywhere, but geological formations vary so greatly that minor differences in tools are sometimes required, and in order to form an intelligent opinion of what is needed in a particular locality, we should know all about the formations. Intending purchasers should give us this information, if possible. Sometimes it is impossible to give accurate information, especially for the first well, so we have prepared a list of material that ought in skillful hands to drill a well in any formation or in any country. While in this outfit there may be more than will be, in all cases, absolutely necessary, yet the extra cost for such things as may possibly be superfluous will be much less than would be incurred by the loss of time in waiting for them if they should be afterward required.

A complete outfit to drill a well 2,000 feet deep, and equip it for pumping (consisting of wood rig ready to set up, boiler on wheels, engine, drilling tools and ropes, fishing tools, several sizes of drive pipe or casing, hydraulic jacks, tubing, and everything necessary) will cost about \$10,000.00 delivered on shipboard, and will weigh about 175,000 pounds.

We have sent similar outfits with experienced workmen to various parts of the world. They have gone to Russia, Austria, Italy, Persia, India, Egypt, Africa, Canada, England, Hungary, Cuba, Peru, Brazil, Honduras, Mexico, Australia, Japan, China, New South Wales, Java, Sumatra, Roumania and other foreign countries, and to almost every State and Territory in this Country.

Skilled workmen require \$125.00 per month and travelling expenses both ways, their time to commence when leaving Pennsylvania and end on their return. We are always willing, without charge, to hire such men for parties who purchase goods from us.

A Cipher Book particularly prepared for business orders to us, will be furnished on application.

NAMES OF PARTS OF RIG.

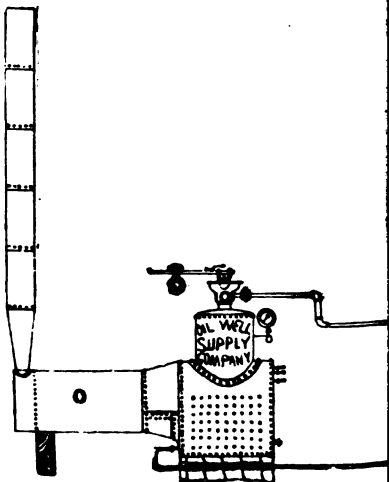
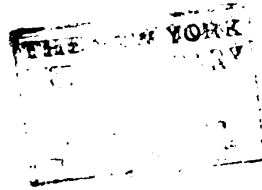
REFERENCE TO FIGURE 1.

A	Nose Sill or Short Sill under end of Main Sill.	R-2	Bull Wheel Post.
A-1	Mud Sill No. 1.	R-3	" " " Brace.
A-2	" " No. 2.	S	Head Ache Post.
A-3	" " No. 3.	T	Derrick Corner.
A-4	" " No. 4.	U	" Girt.
B	Main "	V	" Brace.
C	Sub " or Counter Sill.	W	" Ladder.
D	Sand Reel Tail Sill.	X	Crown Block.
E	Knuckle Post.	Y	Sand Pump Pulley Block.
F	Tail "	a	Flanges, (Fig. 45).
F-1	" " Braces.	b	Shaft Crank and Wrist Pin, (Fig. 45).
G	Front Jack Post.	c	Saddle and Side Irons, (" 47).
H	Rear Jack Post.	d	Stirrup, (" 46).
H-1	" " Brace.	e	Drilling Hook, (" 49).
H-2	" " "	f	Brake Lever, (" 71).
I	Samson Post.	g	" Band, (" 70).
I-1	" " Brace.	h	" Staple, (" 72).
I-2	" " "	i	Crown Pulley, (" 51).
I-3	" " "	j	Sand Pump Pulley, (" 50).
I-4	" " "	k	Engine, (" 106).
J	Walking Beam.	l	" Block.
J-1	" " Cap or Adjuster Board (Fig. 345).	l-1	" Pony Sill.
K	Sand Reel.	l-2	" " "
K-1	" " Lever.	m	" Mud "
K-2	" " Reach.	m-1	" " "
K-3	" " Handle.	n	" Block, Brace (or Bumper).
L	Band Wheel, (Fig. 34).	o	Boiler, (Fig. 100).
M	Pitman.	p	Tank, (" 412).
N	Derrick Foundation Posts.	q	Sand Line, (" 76-a).
O	" Mud Sill.	r	Cable, (" 76).
O-1	" " "	s	Bull Rope, (" 76-b).
P	" Floor "	t	Telegraph Cord.
P-1	" " "	t-1	" Wheel, (" 248).
P-2	" " "	u	Reverse Cord.
P-3	" " "	v	Rope Socket, (" 115).
P-4	" " "	w	Sinker Bar, (" 117).
P-5	" " "	x	Jars, (" 119).
Q	" " 20 Pieces, 2x12 inches x20 ft.	y	Auger Stem, (" 118).
R	Bull Wheels, (Fig. 30).	z	Drilling Bit, (" 120).
R-1	" " Post.	&	Temper Screw. (" 116).
		&-1	Bailer, (" 230).
		&-2	Sand Pump, (" 225).

COMPLETE OIL
READY FOR DRILLING

FIGURE 1.

SIDE ELEVATION, GROUND
SAND LINE, STRING OF



1997

MATERIAL REQUIRED TO BUILD A COMPLETE RIG.

DERRICK 72 FEET HIGH.

The sizes of lumber may be exceeded, but should not be diminished. If necessity compels the use of smaller sizes the deficiency in strength must be supplied by extra bracing. The references are to Fig. 1, except when otherwise stated.

HARDWOOD.

		Size Inches.	Length Feet.
1	Mud Sill, (A ₁),	14x16	16
1	" " (A ₂),	14x16	16
1	" " (A ₃),	14x16	20
1	" " (A ₄),	14x16	20
2	Engine Mud Sills, (m, m ₁),	14x14	14
2	" Pony Sills, (e, e ₁),	2x12	8
1	Sand Reel Tail Sill, (D),	12x12	12
1	Piece for Tail Post, (F),	12x12	5
1	" " Jack Post (G) and Knuckle Post, (E),	16x16	16
1	Piece for Jack Post Caps,	4x10	3
2	Pieces for Bull Wheel Posts, (R ₁ , R ₂),	10x10	11
3	" " Keys,	3x 5	16
1	Pitman, (M),	4x4-4x9	12
1	Piece for Crown Block, (X),	2x12	20
1	" " Sand Sheave Pulley Block, (Y),	2x12	5
1	Sand Reel Lever, (K ₁),	6x 8	8
1	Piece for Adjuster Board, (J ₁), (Fig. 345),	2x12	5
1	Piece for Sand Reel Handle, (K ₃),	2x 6	8

HEMLOCK OR PINE.

1	Nose Sill, (A),	16x18	6
1	Main Sill, (B),	16x18	33
1	Sub Sill, (C),	16x18	16
2	Derrick Mud Sills, (O, O1),	10x10	21
6	“ “ Floor Sills, (P, P5),	8x10	20
1	Walking Beam, (J),	12x26	26
1	Samson Post, (I),	16x16	13
2	“ “ Braces, (I1, I4),	6x 8	14
1	“ “ Brace, (I2),	6x 8	16
1	“ “ “ (I3),	6x 8	12
1	Engine Block, (I1),	20x20	8
1	Head Ache Post, (S),	7x 7	14
1	Bull Wheel Post Brace, (R3),	6x 8	14
1	Bumper from Engine Block to Mud Sill, (n),	6x 6	33
20	Pieces for Derrick Floor, (Q),	2x12	20
2	Jack Post Braces,	6x 8	16
6	Foundation Posts, (N),	16x18	4

DERRICK LEGS, (T).

16	Pieces.	.	.	.	.	2x 8	16
14	"	.	.	.	.	2x10	16
2	"	.	.	.	.	2x 8	20
4	"	.	.	.	.	2x10	18
4	" (Doublers,)	.	.	.	.	2x10	18

BULL WHEEL GIRL.

1 Piece, 2x12 18 1/2

DERRICK GIRTS, (U).

4	Pieces,	.	.	.	.	1½ x 10	16
4	"	.	.	.	.	2 x 12	18
4	"	.	.	.	.	1½ x 10	16
4	"	.	.	.	.	1½ x 10	14
4	"	.	.	.	.	1½ x 10	12
4	"	.	.	.	.	1½ x 10	10
4	"	.	.	.	.	1½ x 10	8
4	"	.	.	.	.	1½ x 10	6

DERRICK BRACES, (V).

						Size Inches.	Length Feet.
6	Pieces,	.	.	.	.	2x6	18
8	"	.	.	.	.	2x6	18
8	"	.	.	.	.	1 ½x6	16
8	"	.	.	.	.	1 ½x6	14
8	"	.	.	.	.	1 ½x6	12
8	"	.	.	.	.	1 ½x6	10
8	"	.	.	.	.	1 ½x6	9

CORNICE.

1	Piece,	.	.	.	.	1 1/2 x 14	16
1	"	.	.	.	.	1 1/2 x 10	16
1	"	.	.	.	.	1 1/2 x 6	18
1	"	.	.	.	.	1 1/2 x 12	16
2	" (Top),	.	.	.	.	1 1/2 x 12	16

MISCELLANEOUS.

1	Piece for Reach,	2x6	18
2	Pieces for Reach,	1x6	14
2	" " Beam Frame,	2x6	10
1	Piece " " "	1x12	6
2	Pieces for Beam Braces,	2x6	14
3	" " Derrick Roof,	2x8	16
2	" " Forge Roof,	2x10	16
8	" " Sills for Belt and Engine Houses,	2x6	16
2	Pieces for Sills for Belt and Engine Houses,	2x6	12
12	Pieces for Plates for Belt and Engine Houses,	2x4	16
4	Pieces for Plates for Belt and Engine Houses,	2x4	12
8	Pieces for Ladder. (W),	2x4	16
3,000	Feet Boards,	1x12	16

NAILS USED IN DERRICK.

125 lbs. 10d. 25 lbs. 20d. 100 lbs. 30d.

FOR WHEELS.

1 Set of Bull Wheel Cants, (Fig 30a).
1 " " Arms, (" ").
1 " " Pins, (" ").
1 Bull Wheel Shaft, (Fig. 30b).
1 Set Band Wheel and Tug Pulley Cants. (Fig. 37a).
1 Sand Pump Reel, (Fig. 38).
The Bull Wheel Shaft, Arms and Pins are made of Hard Wood.

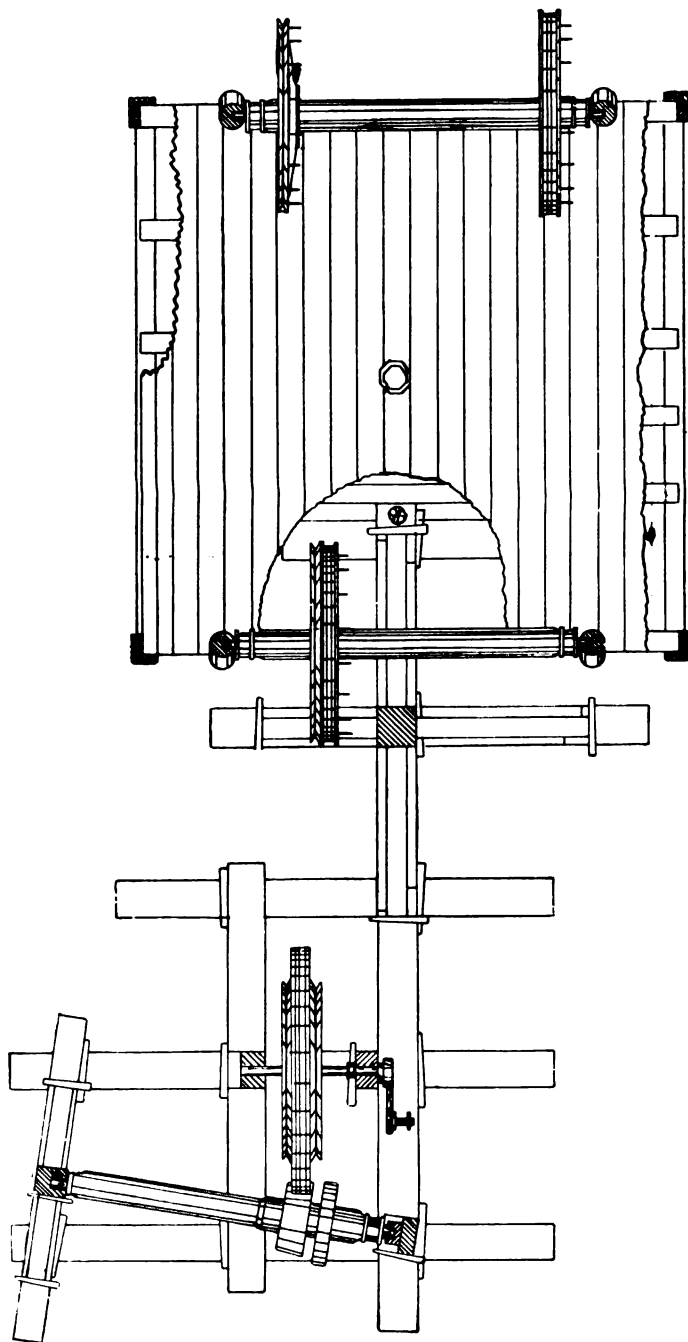
Some of the Cants are Hemlock and some Pine.

IRONS FOR RIG.

- 1 Derrick (or Crown) Pulley (i,) (Fig. 51).
- 1 Sand Pump Line Pulley (j,) (Fig. 50).
- 1 Stirrup (d,) (Fig. 46).
- 1 Saddle and Side Irons with Bolts (c,) (Fig. 47).
- 1 Shaft, Crank, Wrist Pin and Collar, (Fig. 45).
- 1 Pair Flanges with Bolts (a,) (Fig. 45).
- 1 Back Brake for Sand Reel, (Fig. 73).
- 1 Brake Band (g,) (Fig. 70).
- 1 Brake Lever (f,) Fig. 71).
- 1 Brake Staple (h,) (Fig. 72).
- 1 Pair Bull Wheel Gudgeons, (Fig. 48).
- 1 Hook, (Fig. 49).

GROUND PLAN.

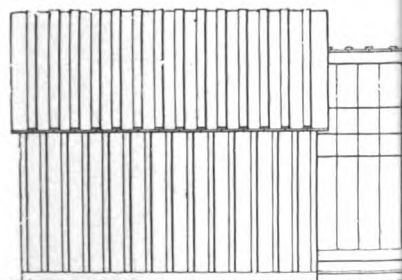
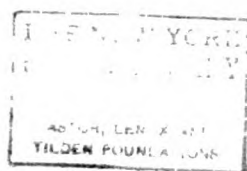
FIGURE 2 A.



Showing two Bull Wheels, and the band wheel with an extra tug pulley for operating the extra bull wheel.

Two Bull Wheels are required when drilling in soft formations ; one to lift and lower the pipe or casing, the other to hold the drilling cable.

THE LOWER PART OF
MACHINERY AND WO

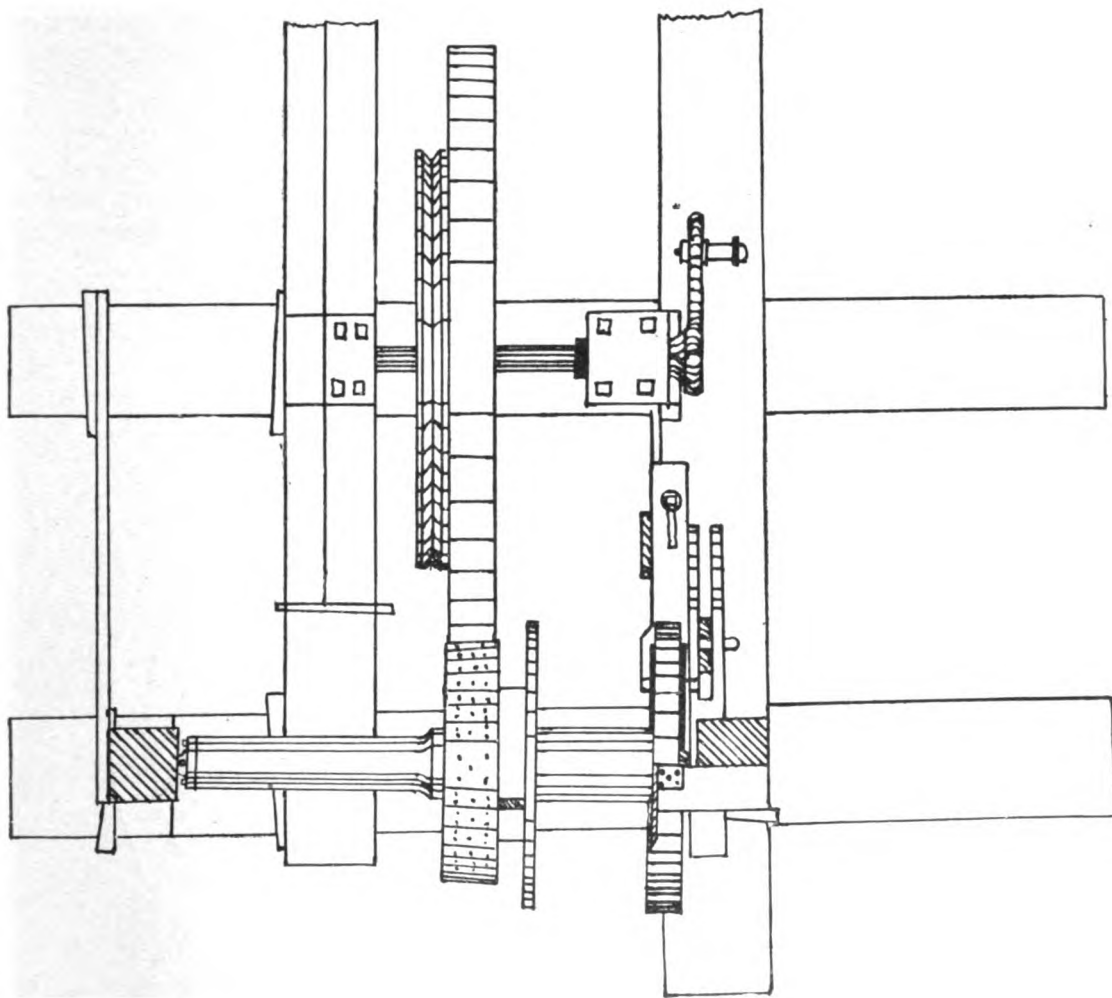


ENGINE HOUSE.

TILDEW. P. 10. 11. 12.

GROUND PLAN
OF
Straight Line Patent Sand Pump Reel,
WITH
SHORT MUD SILLS.

FIGURE 4.



This Reel is shown at Figure 41. The weight of the line draws the reel straight against the band wheel thus securing smoothness and rapidity of motion.

FIGURE 4 A.—REAR VIEW.

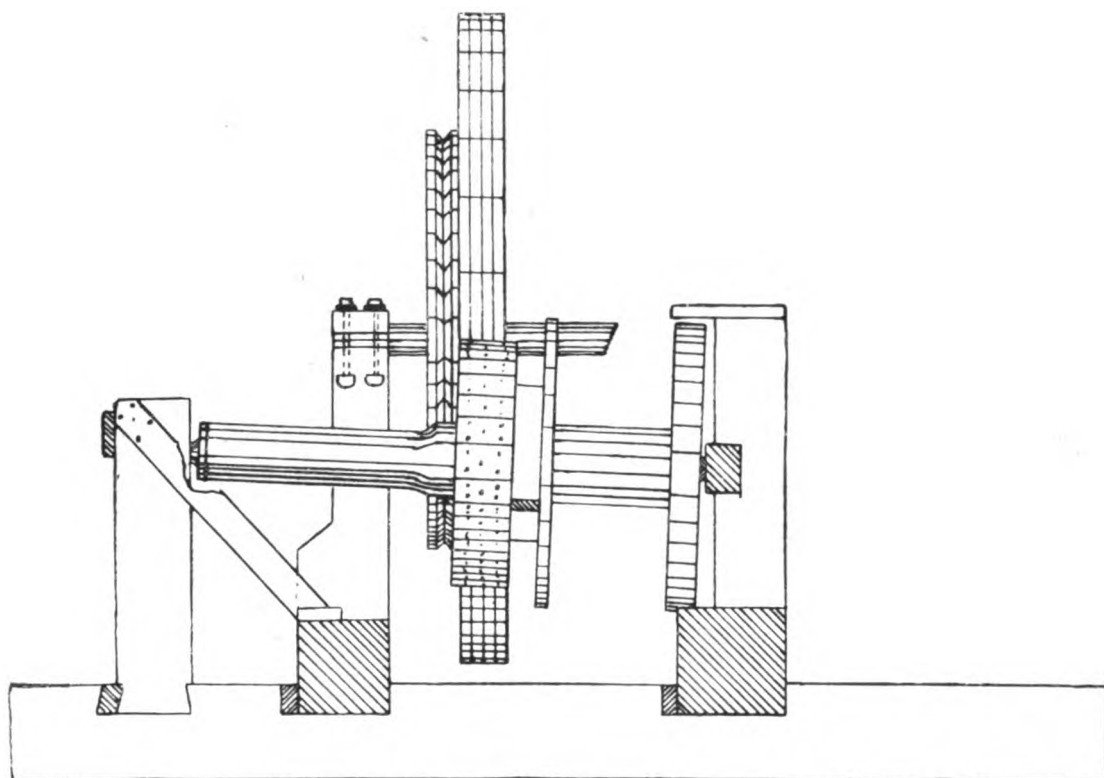
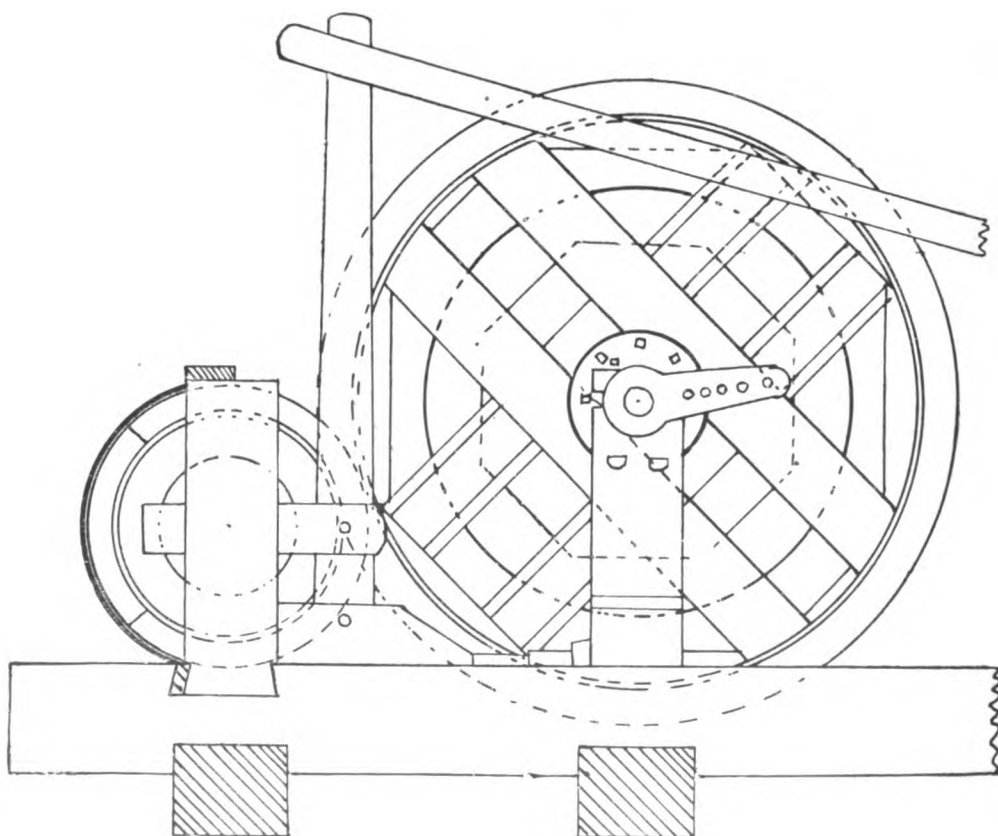


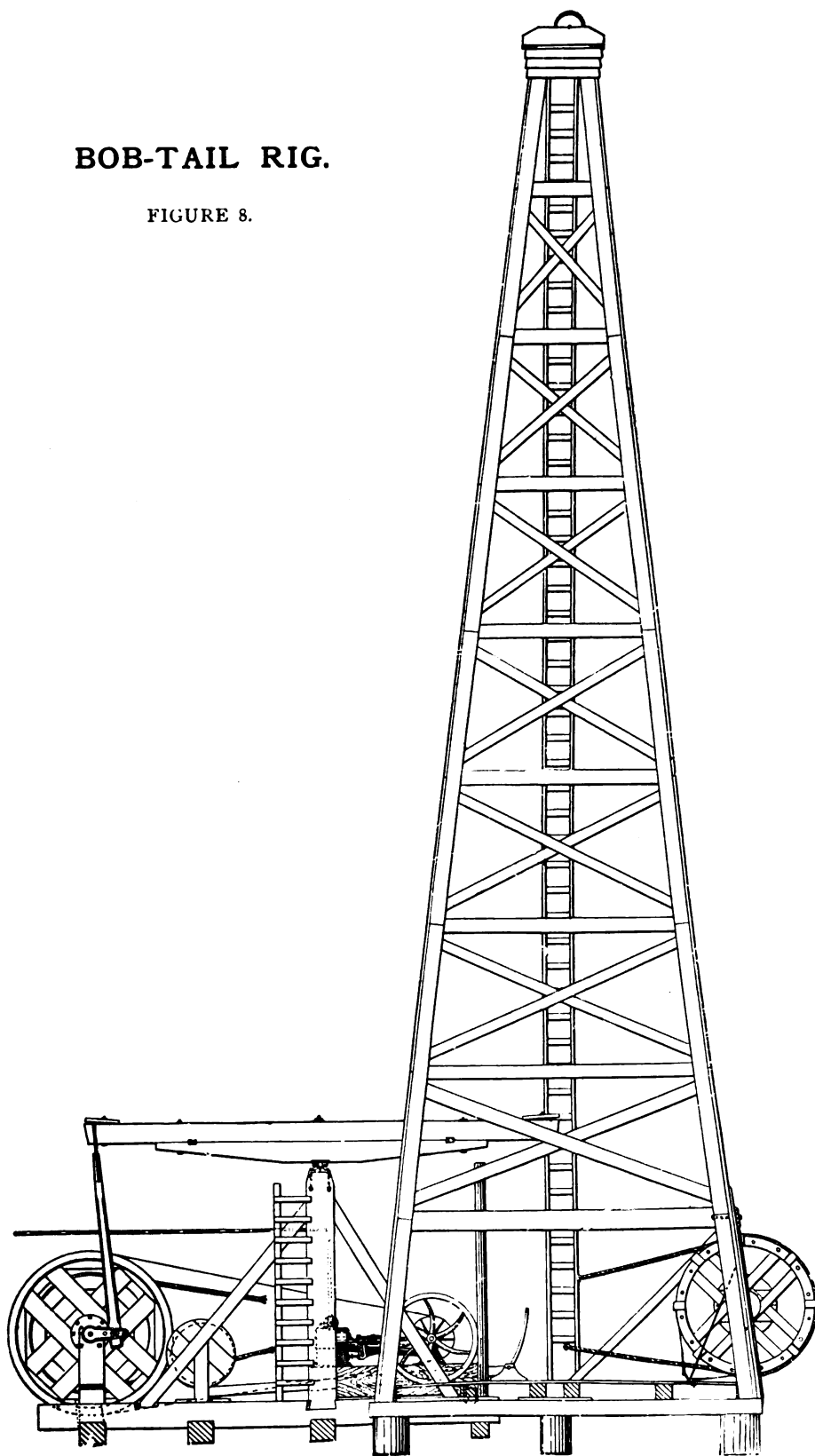
FIGURE 4 B.—SIDE VIEW.



SEE FIGURE 4 FOR EXPLANATION.

BOB-TAIL RIG.

FIGURE 8.

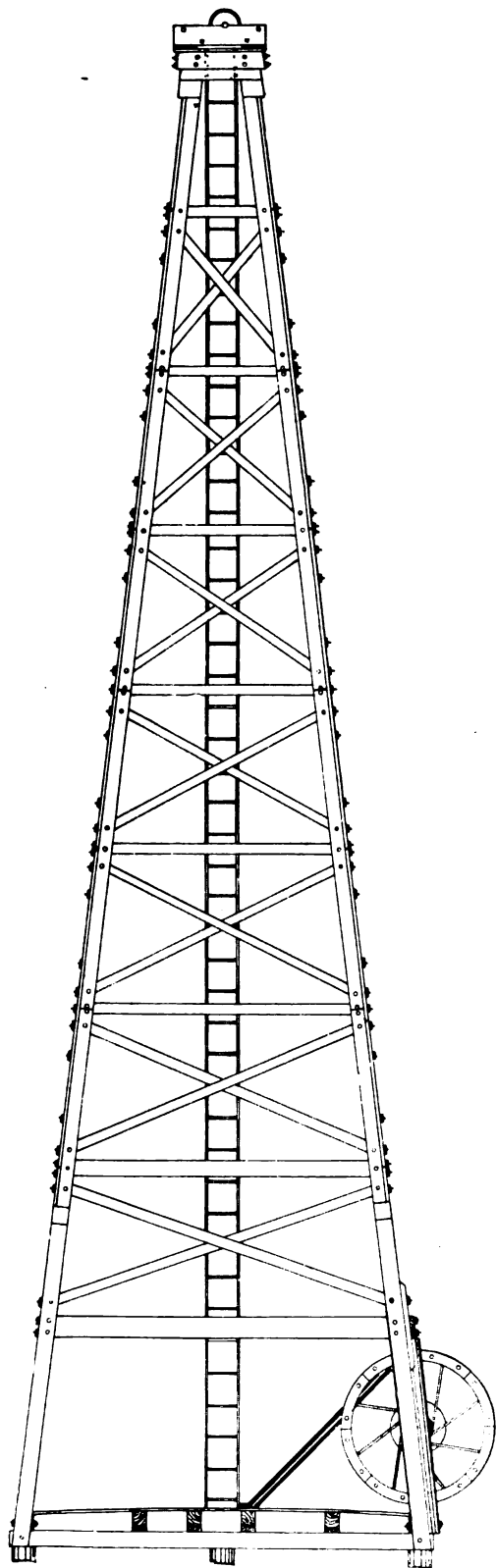


Used where space is limited. It requires but 43 x 21 feet.

BOLTED DERRICKS.

72 FEET HIGH.

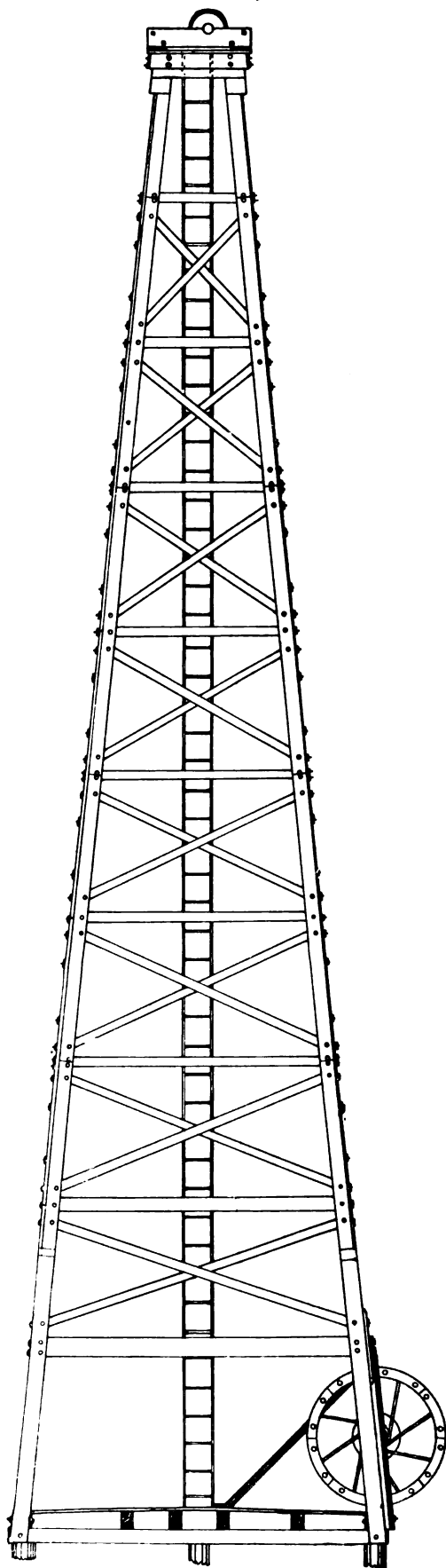
FIGURE 9.



These derricks are made of seasoned pine and are painted. The parts are fastened together by bolts in iron corner pieces. No nails are used. They are especially adapted for being moved from place to place, as they are easily and quickly put up or taken down. The various pieces are numbered and the parts which are joined are specially marked. They are made of any height from 40 to 82 feet.

82 FEET HIGH.

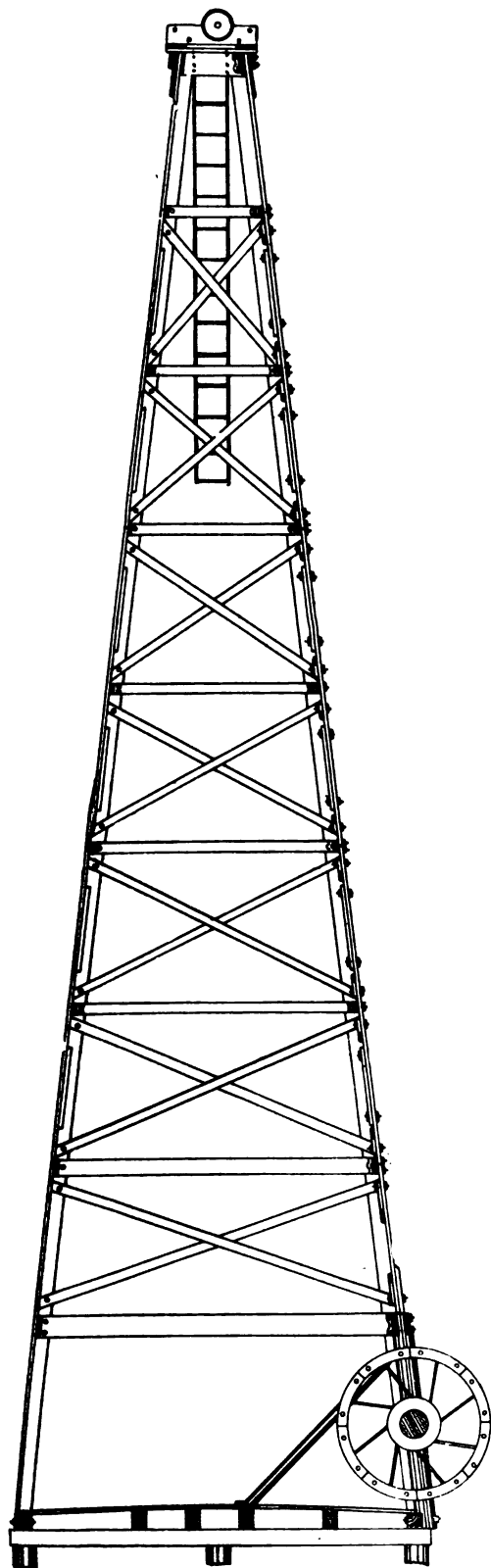
FIGURE 9 A.



BOLTED DERRICKS.

SECTIONAL VIEW.

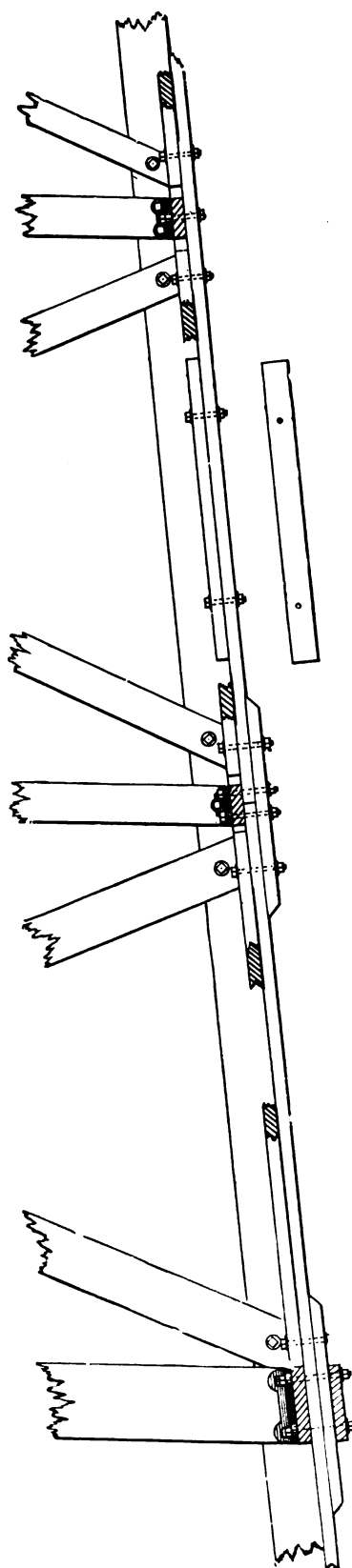
FIGURE 9 B.



These derricks are made of seasoned pine and are painted. The parts are fastened together by bolts in iron corner pieces. No nails are used. They are especially adapted for being moved from place to place, as they are easily and quickly put up or taken down. The various pieces are numbered and the parts which are joined are especially marked. They are made of any height from 40 to 82 feet.

CORNER OF DERRICK ENLARGED.

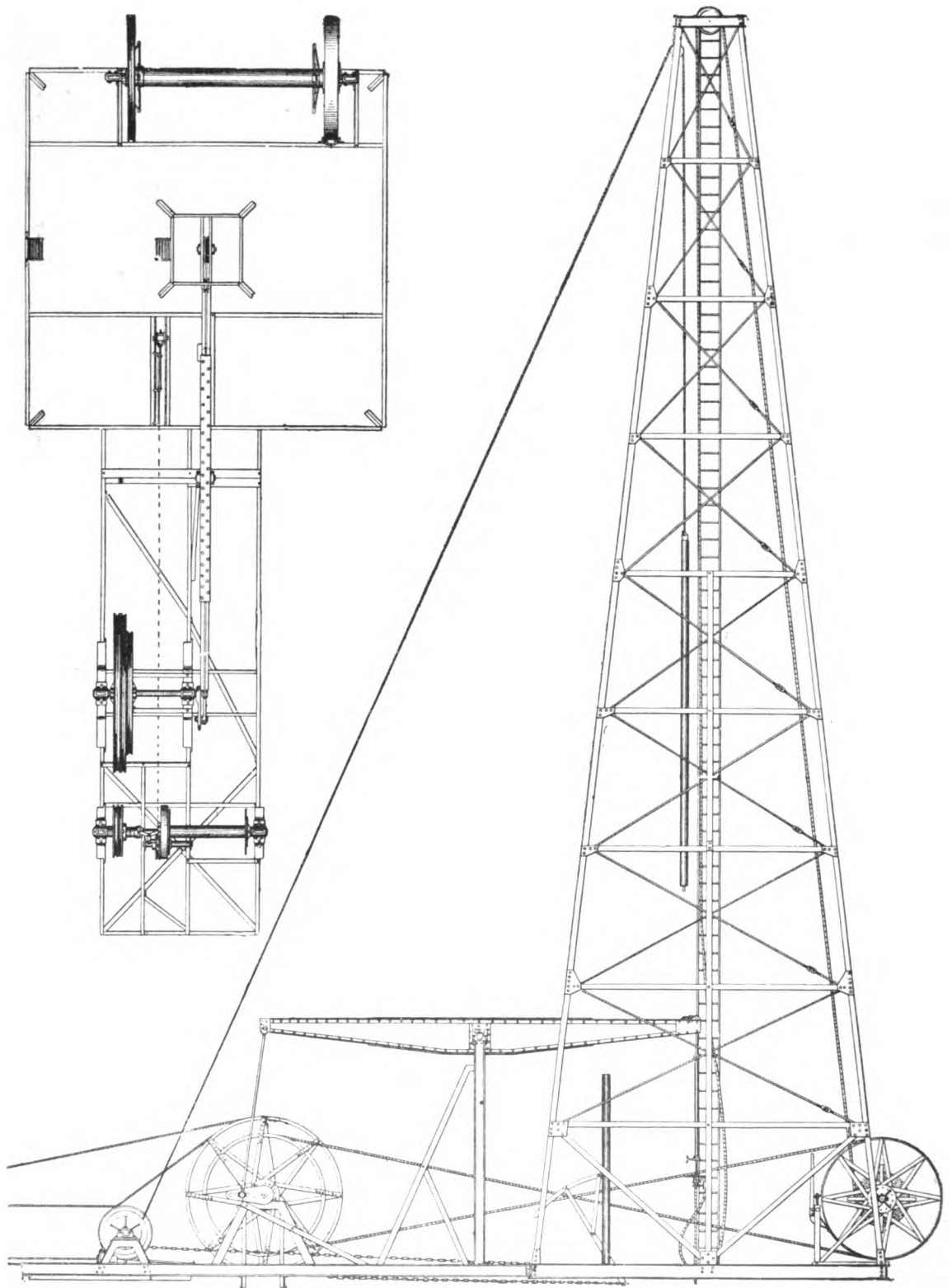
FIGURE 10.



COMPLETED STEEL RIG FOR DRILLING WELLS.

FIGURE 11 A.

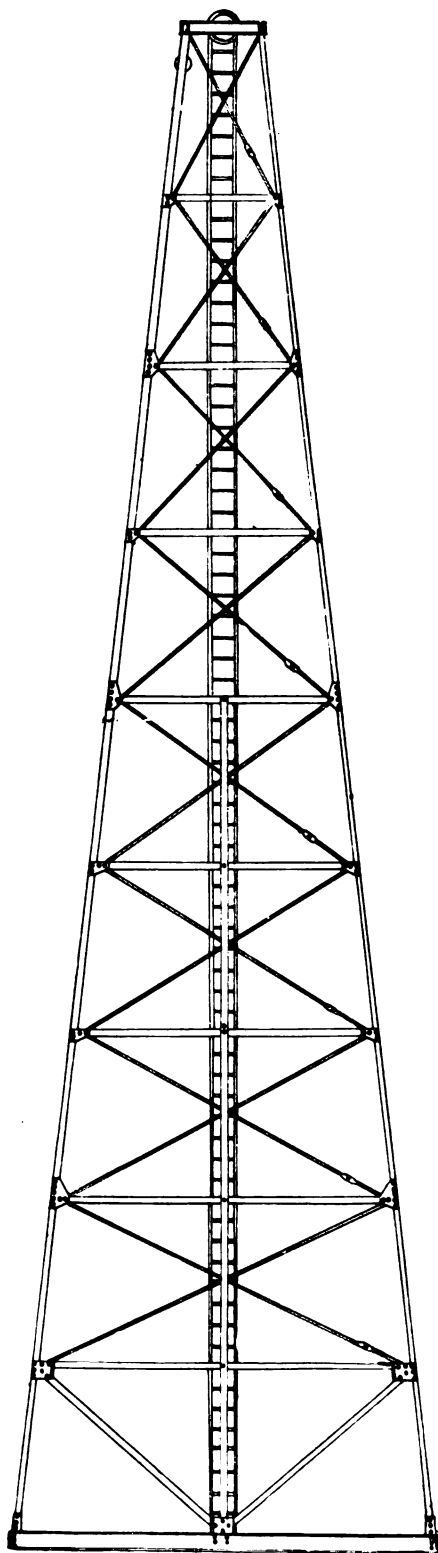
SIDE VIEW AND GROUND PLAN.



STEEL DERRICK.

HEIGHT 72 FEET.

FIGURE 11 B.



A steel rig has many advantages over a wooden one. Being practically indestructible, it can be used over and over again. It is composed of light pieces easily transported and handled, which are fastened together with bolts. Every part is made of steel. Power is applied by a rope running through double grooves in the engine pulley, band wheel and sand reel head.

The first cost of the steel rig is more than the wooden one, but the extra cost is saved by three removals, and in hot countries where wood decays rapidly the steel rig is the one to be used.

The first rig of this kind was sent to Australia for use in a district where wood decayed rapidly. The outfit gave complete satisfaction.

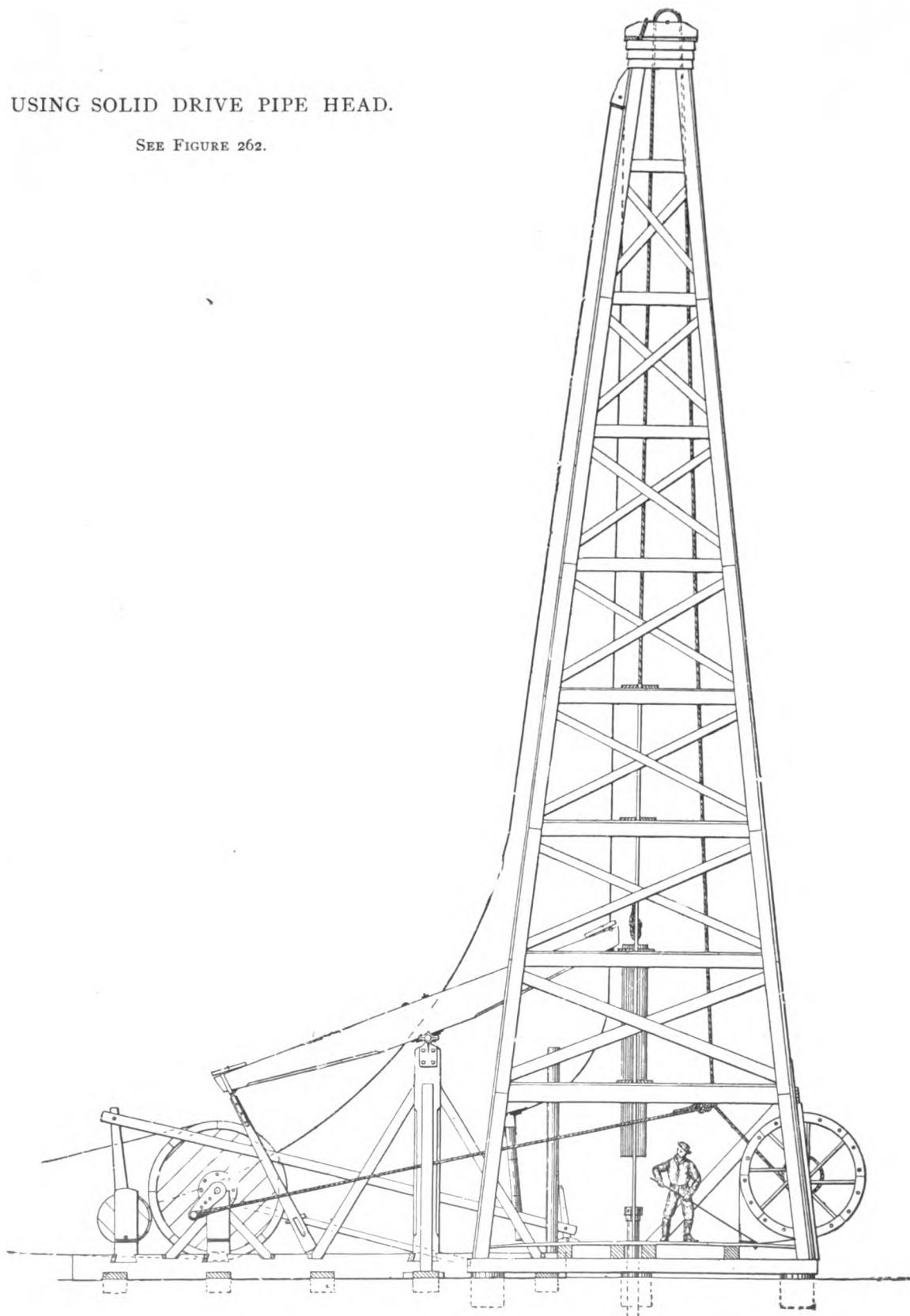
The derrick can be furnished separately.

DRIVING PIPE WITH WOODEN MAUL.

FIGURE 12.

USING SOLID DRIVE PIPE HEAD.

SEE FIGURE 262.



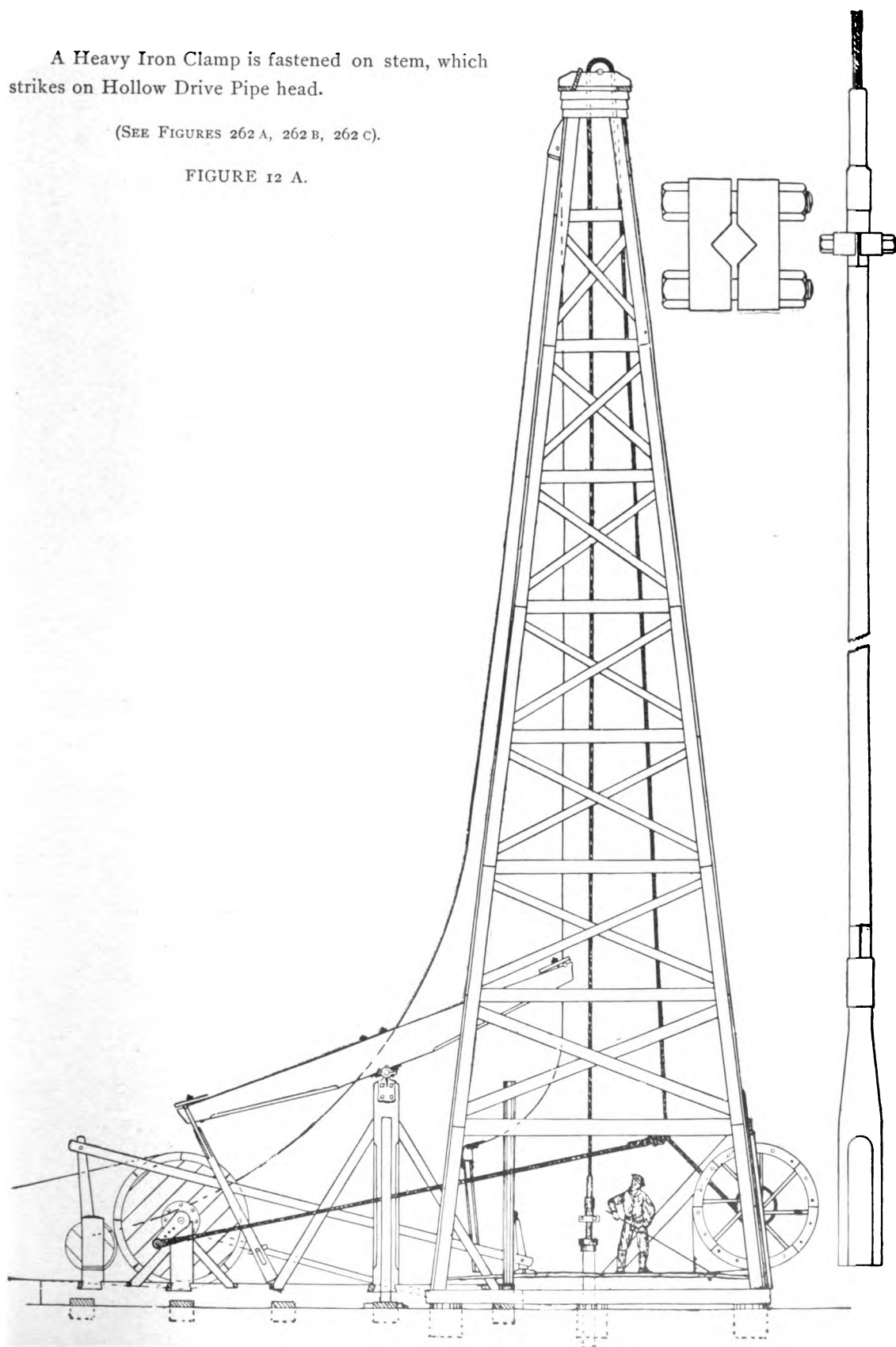
Substantially the same method is used in "spudding," *i.e.*, drilling down to the rock.

DRIVING PIPE WITH DRILLING TOOLS.

A Heavy Iron Clamp is fastened on stem, which strikes on Hollow Drive Pipe head.

(SEE FIGURES 262 A, 262 B, 262 C).

FIGURE 12 A.



Interior view of Derrick, showing workmen Dressing Tools.

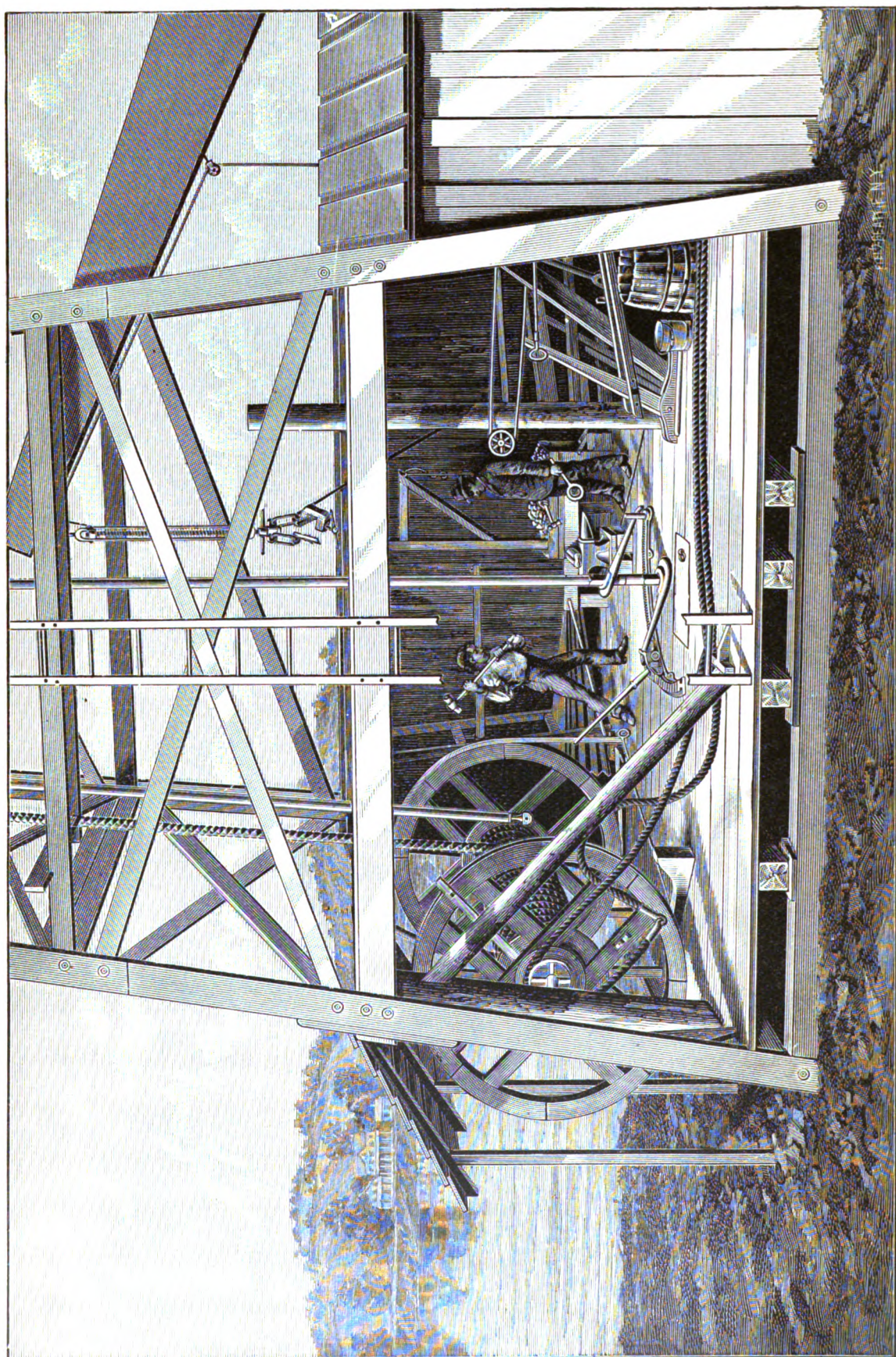
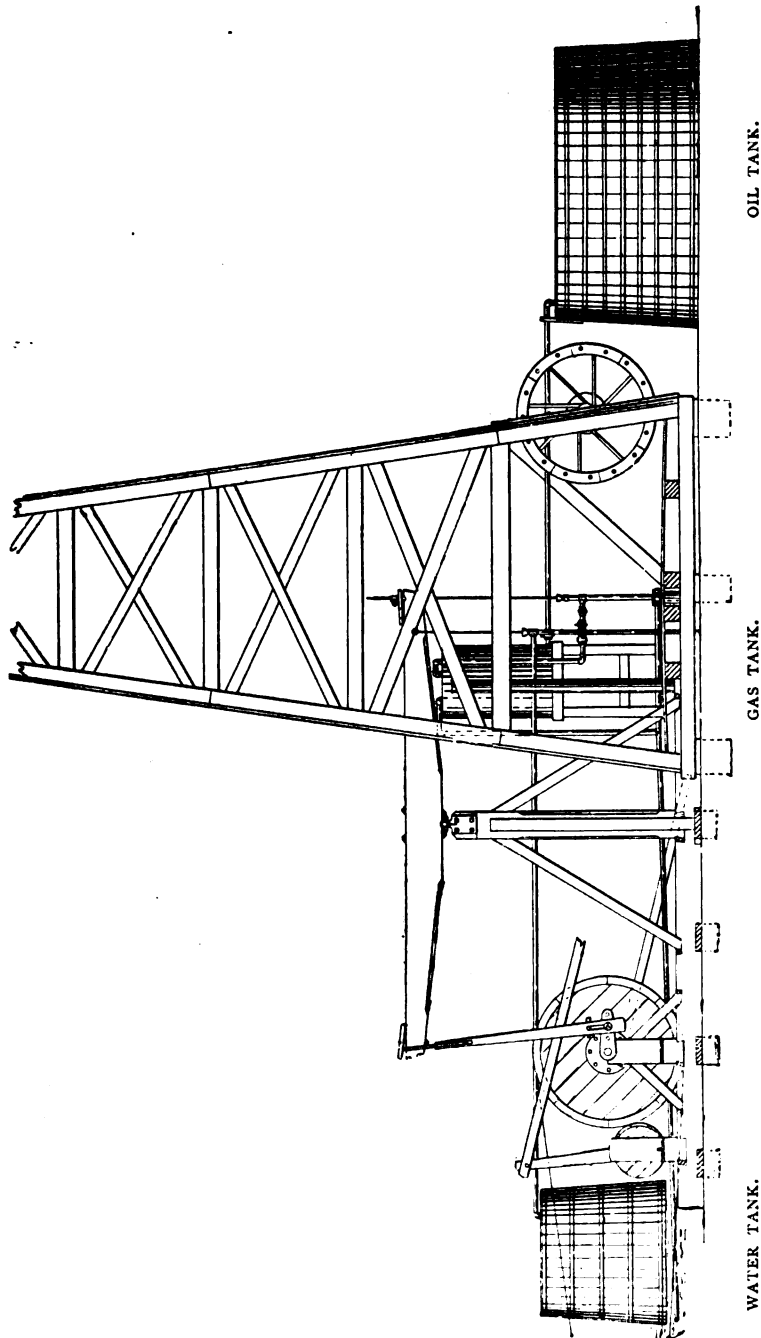


FIGURE 13.

Showing location of forge, bellows, anvil, &c.

PUMPING WELL.

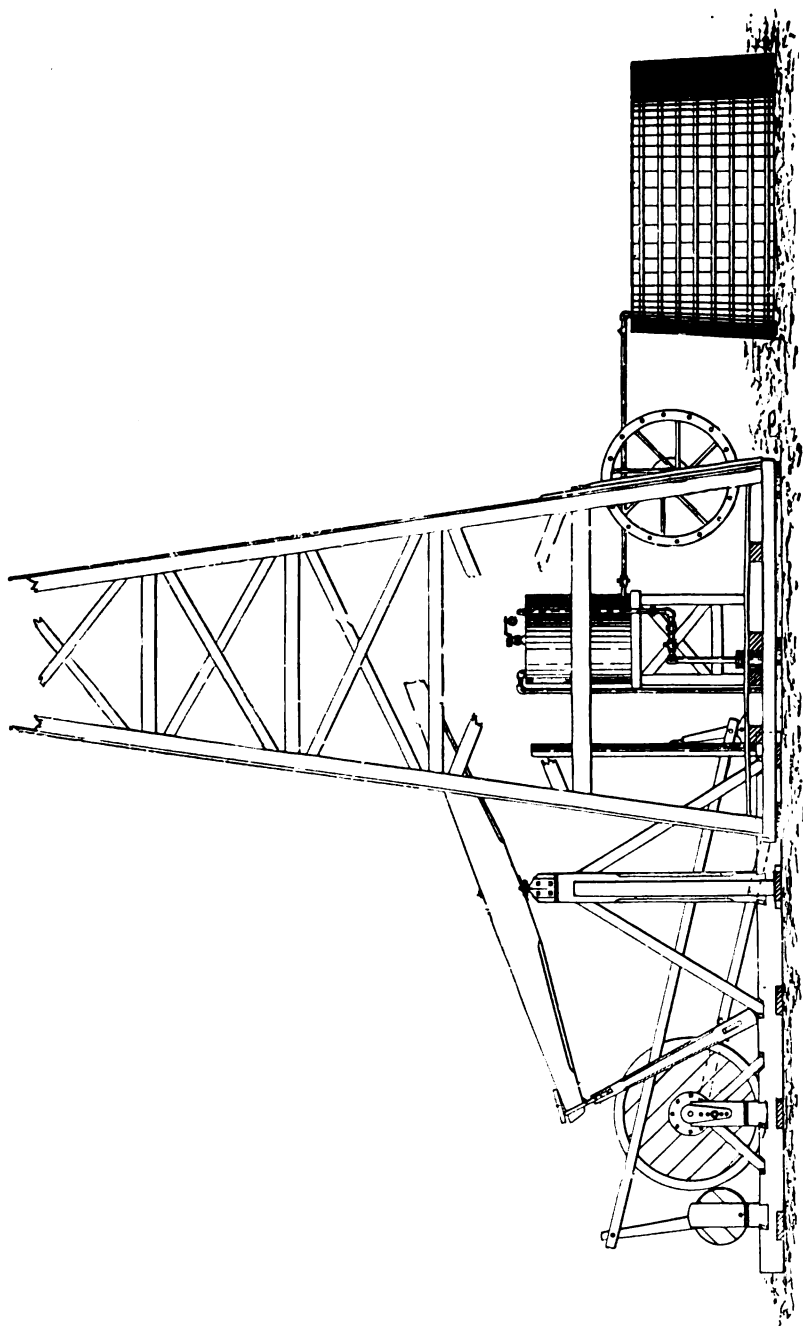
FIGURE 14.



In this illustration a water well is shown as drilled a few feet from the oil well, on a line with the Samson post. The pumping rods of each well are attached to the walking-beam and they are operated with the same stroke. The oil is pumped into the gas tank (see figure 410) and is there separated by its own gravity from the gas. By means of pipe in the bottom of the gas tank, the oil is conducted to the oil tank. The gas pipe extends from the upper part of the gas tank and conducts the gas to the furnace, where it is burned.

FLOWING WELL.

FIGURE 15.



The oil flows into the gas tank and is separated by its own gravity from the gas, and is then conducted to the large tank on the right. The gas is led by a pipe from the top of the gas tank and is used for either fuel or light. A gas tank is essential to separate the oil from the gas. For gas tank see Figures 410 and 411. Wooden tank see Figure 412.

PARTS OF A PORTABLE RIG.

REFERENCES TO FIGURES 16, 16-B, 17, 17-A AND 18.

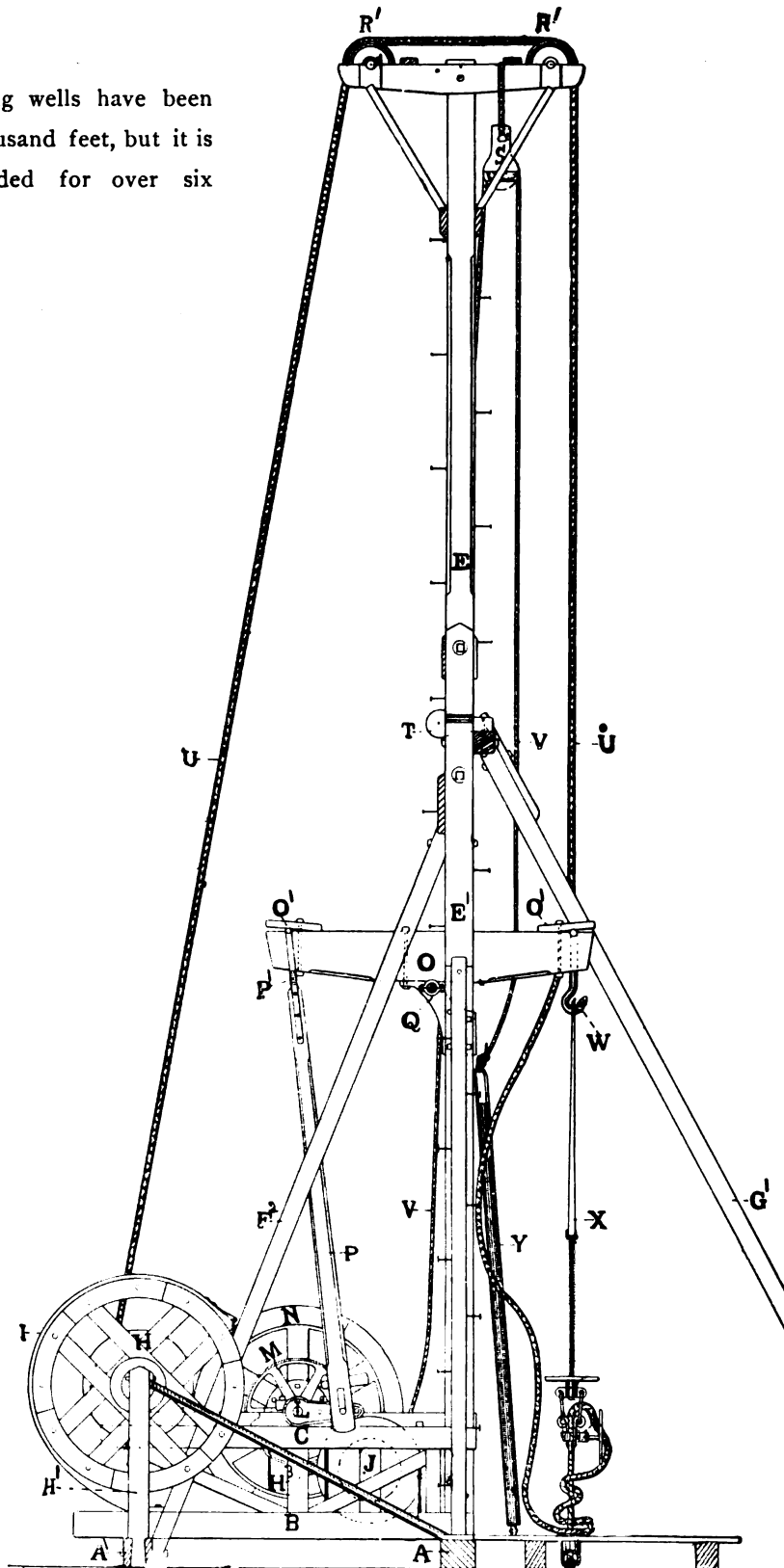
A	Front Main Sill.	I-3	Bull Wheel Lever Reach Handle, (Fig. 17).
A-1	Rear Main Sill.	J	Sand Reel.
B	Left Lower Main Sill.	J-1	Left Sand Reel Post.
B-1	Right Lower Main Sill, (Fig. 17 and 17-a).	J-2	Right Sand Reel Post.
C	Left Upper Main Sill.	K	Sand Reel Brake Band, (Fig. 18).
C-1	Right Upper Main Sill, (Fig. 17 and 17-a).	K-1	Sand Reel Brake Band Post, (Fig. 18).
D	Rear Frame Brace, (Fig. 18).	K-2	Sand Reel Reach, Fig. 18).
D-1	Center Frame Brace, (Figs. 17, 17-a & 18).	K-3	Sand Reel Reach Handle, (Fig. 18).
E	Mast.	L	Shaft Crank and Wrist Pin, (Fig. 16-B).
E-1	Left Lower Mast.	M	Friction Wheel.
E-2	Right Lower Mast, (Fig. 17).	N	Band Wheel, (See also Fig. 18).
F	Left Side Brace, (Fig. 17).	O	Walking Beam.
F-1	Right Side Brace, (Fig. 17).	O-1 O-1	Adjuster Boards.
F-2	Left Rear Brace.	P	Pitman.
F-3	Right Rear Brace.	P-1	Stirrup.
G	Cross Bar, (Fig. 17).	Q	Center Irons.
G-1	Left Front Ground Brace.	R	Large Crown Pulley, (Fig. 16-B).
G-2	Right Front Ground Brace.	R-1 R-1	Small Crown Pulleys.
H	Bull Wheels.	S	Sand Line Pulley.
H-1	Left Bull Wheel Post.	T	Sand Line Guide Pulley.
H-2	Right Bull Wheel Post, (Fig. 18).	U	Cable.
H-3	Left Bull Wheel Post Brace.	V	Sand Line.
I	Bull Wheel Band.	W	Drilling Hook.
I-1	Bull Wheel Lever, (Fig. 18).	X	Temper Screw.
I-2	Bull Wheel Lever Reach, (Fig. 18).	Y	Bailer.

PORTABLE RIG.

SIDE ELEVATION.

FIGURE 16.

With this rig wells have been drilled one thousand feet, but it is not recommended for over six hundred feet.

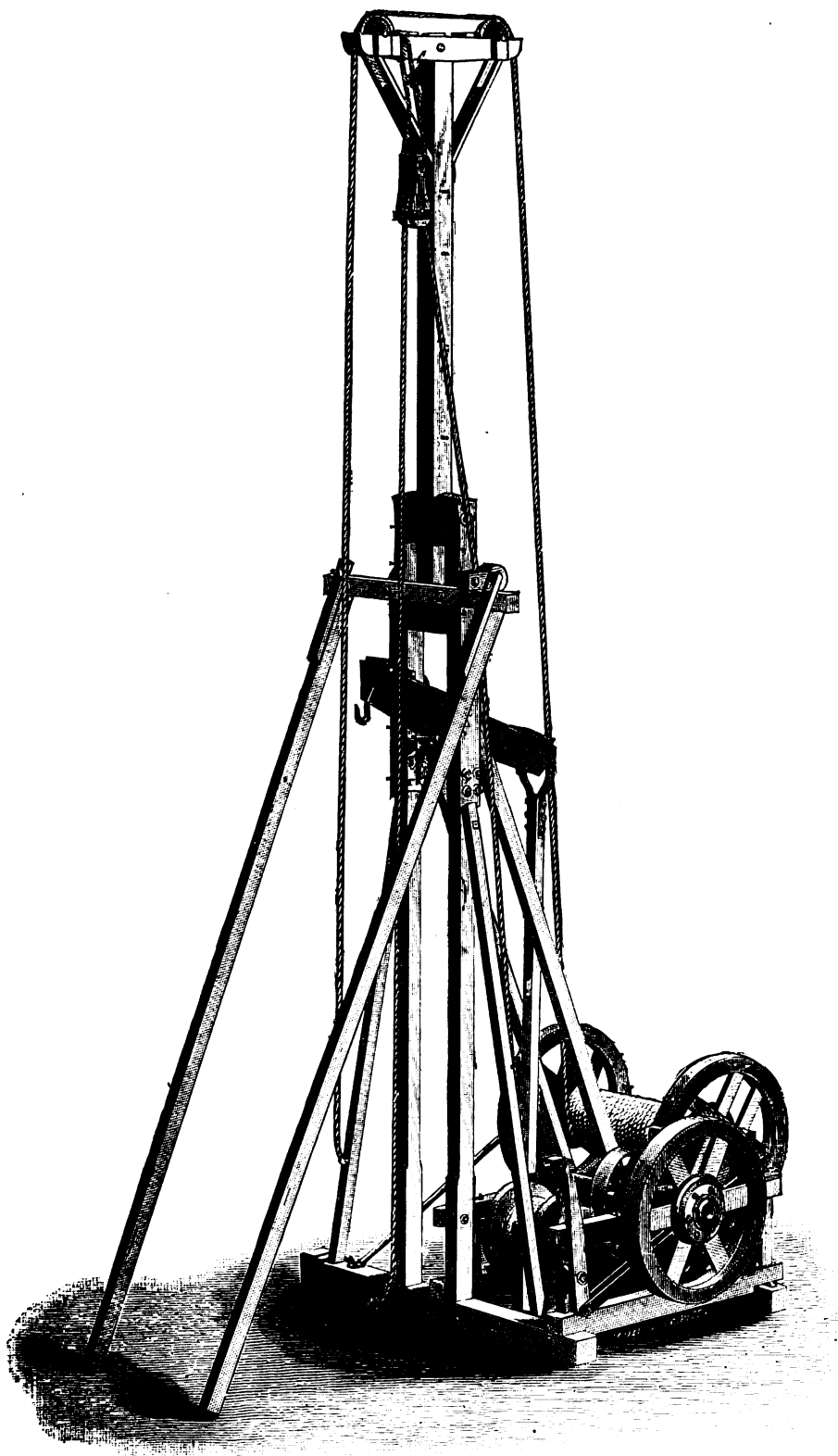


Two Crown Pulleys.

PORTABLE RIG.

PERSPECTIVE VIEW OF FIGURE 16

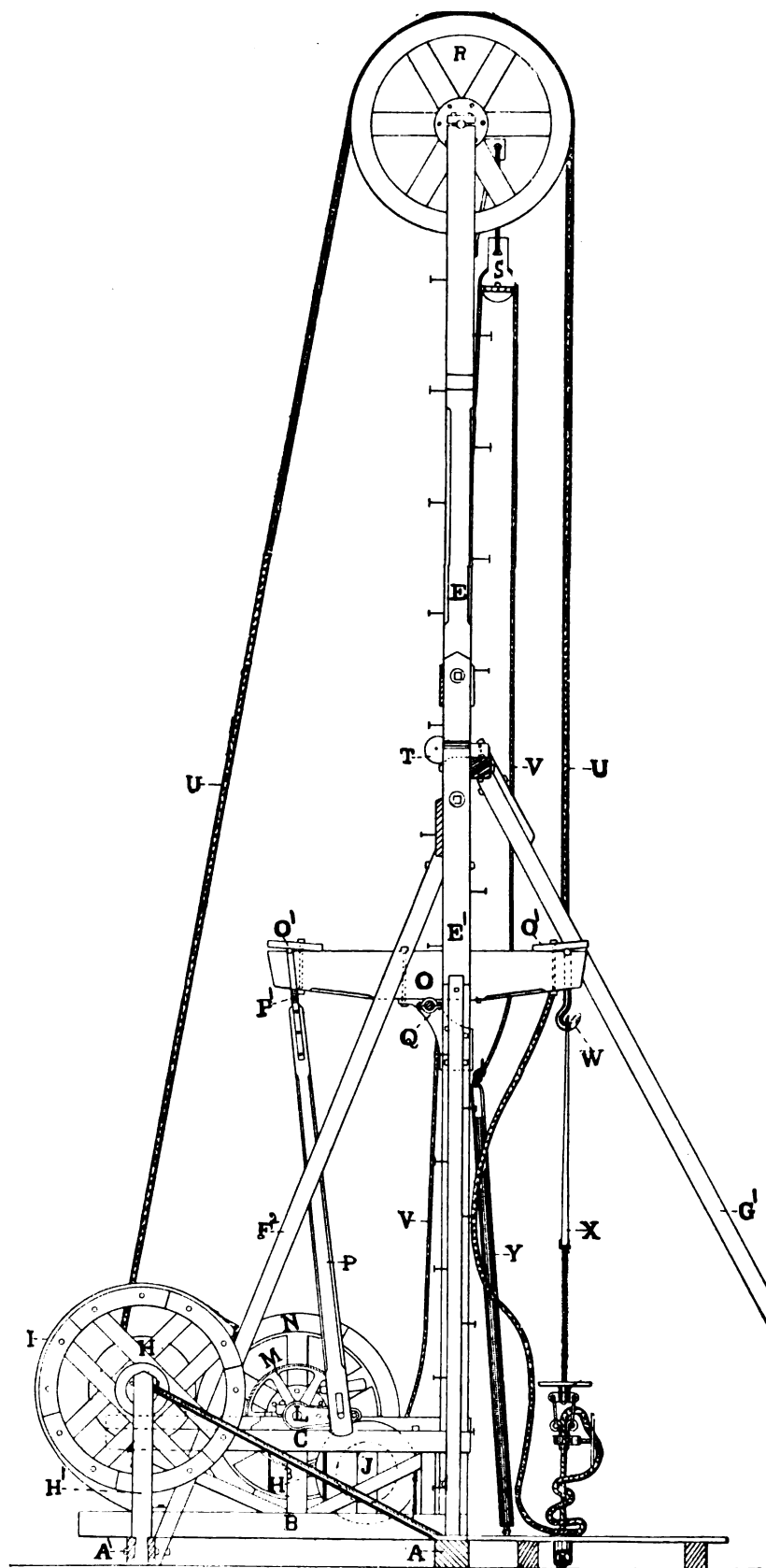
FIGURE 16 A.



PORTABLE RIG.

SIDE ELEVATION.

FIGURE 16 B.

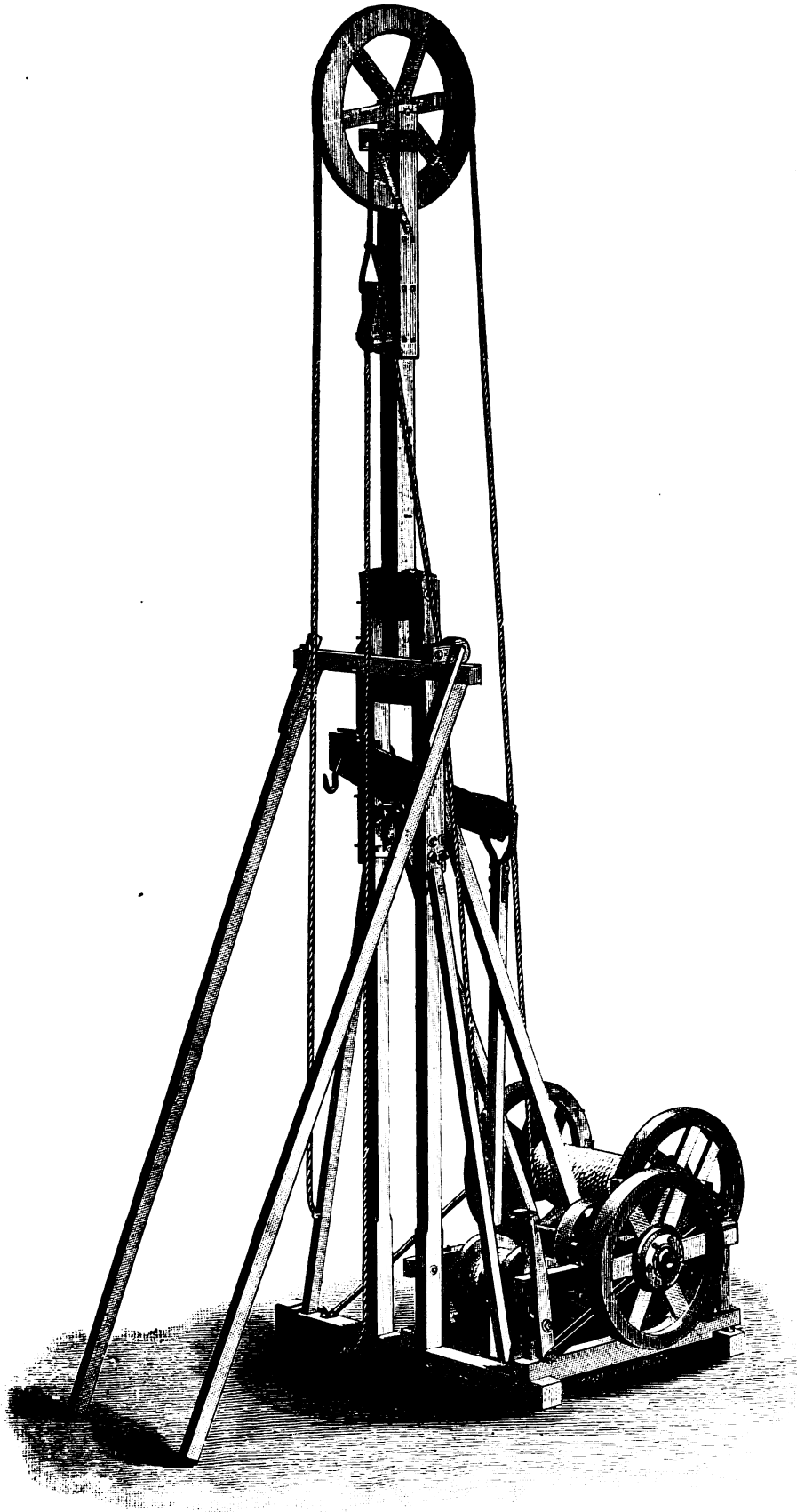


With large Single Crown Pulley.

PORTABLE RIG.

PERSPECTIVE VIEW OF FIGURE 16 B.

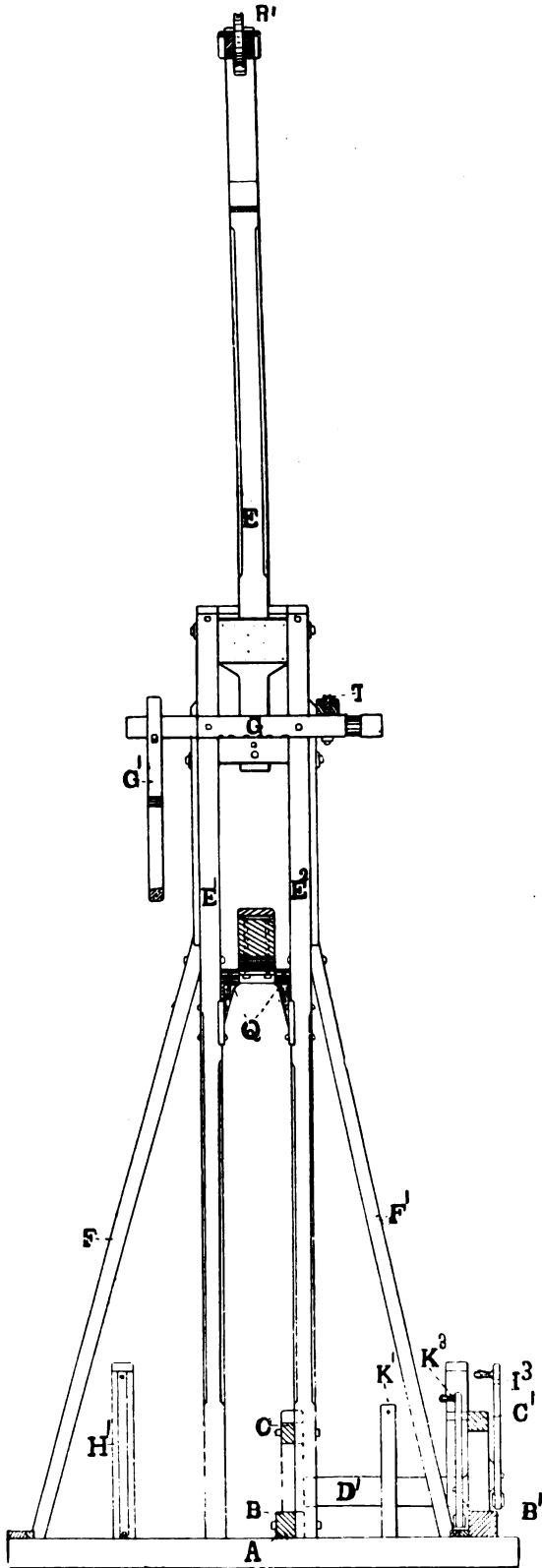
FIGURE 16 C.



PORTABLE RIG.

FRONT ELEVATION.

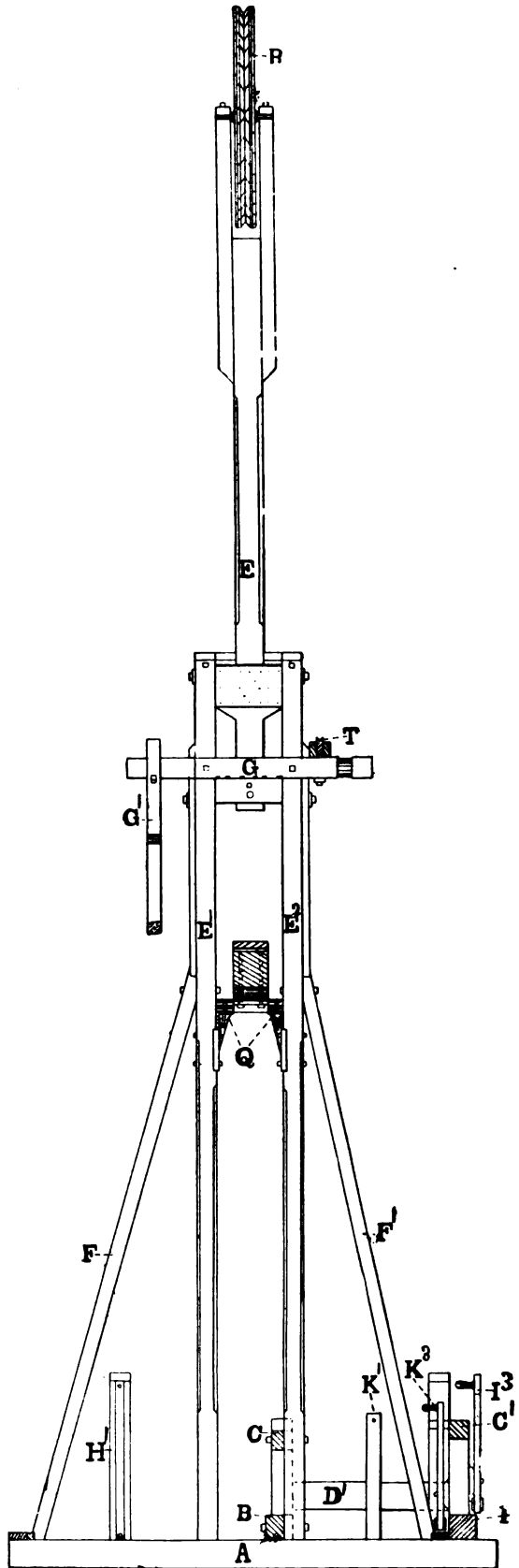
FIGURE 17.



With two Crown Pulleys.

FRONT ELEVATION.

FIGURE 17 A.



With single Crown Pulley.

PORTABLE RIG.

GROUND PLAN.

FIGURE 18.

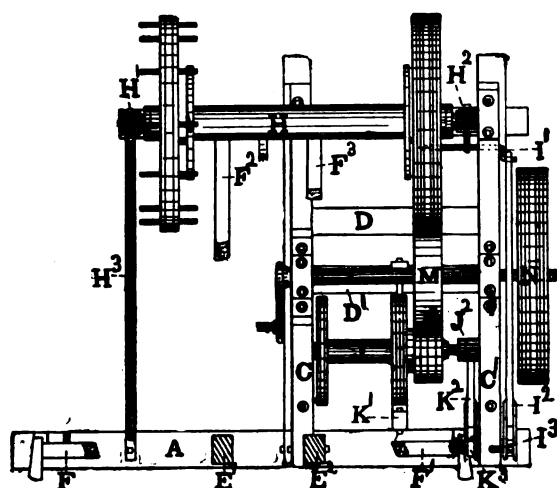
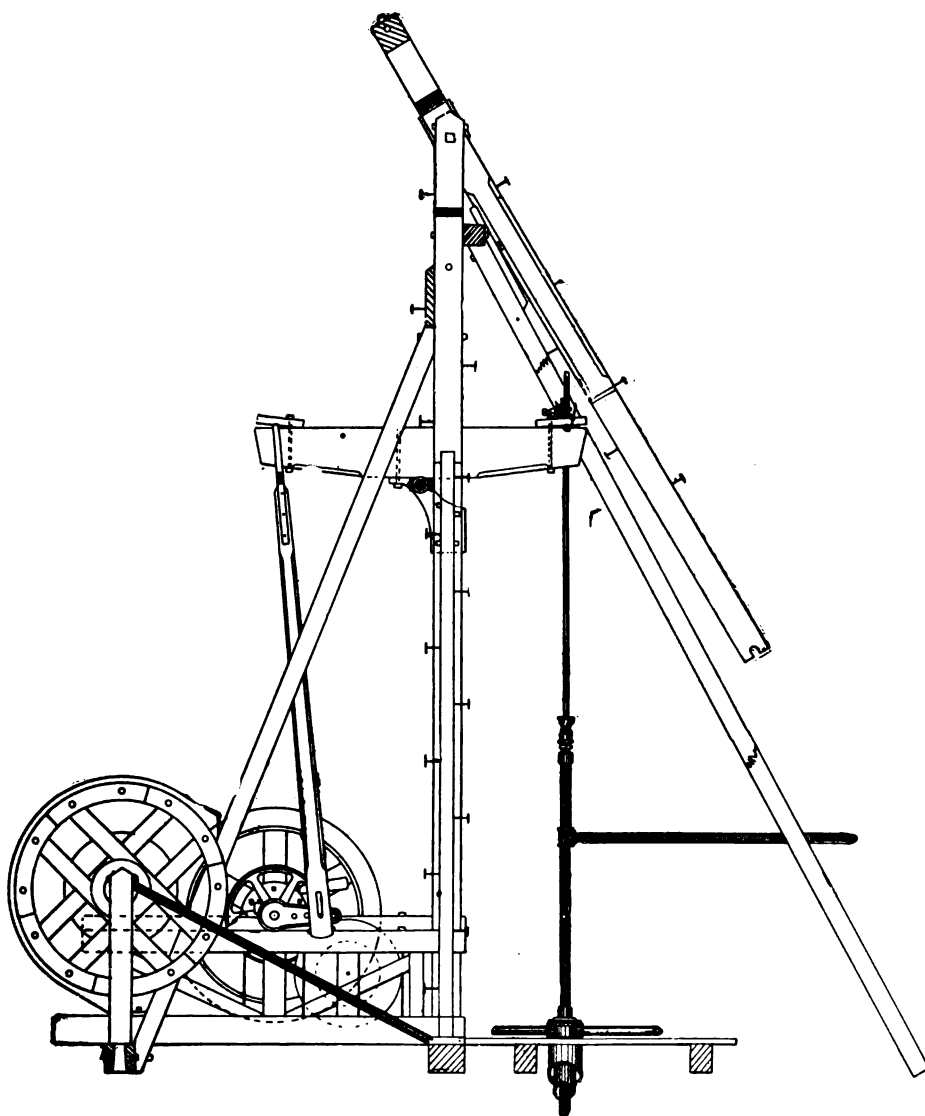
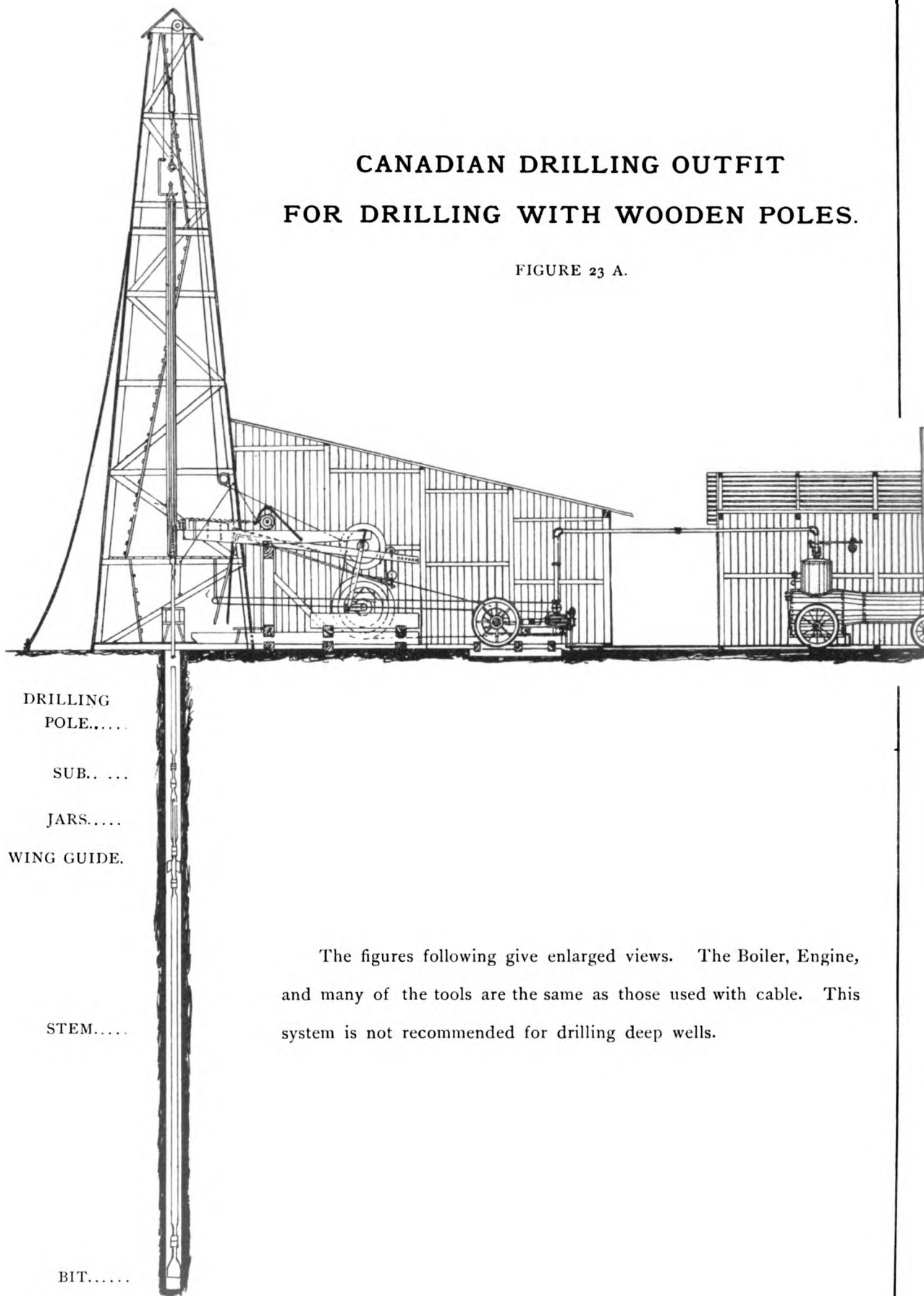
**PORTABLE RIG, ARRANGED FOR PUMPING.**

FIGURE 21.



CANADIAN DRILLING OUTFIT FOR DRILLING WITH WOODEN POLES.

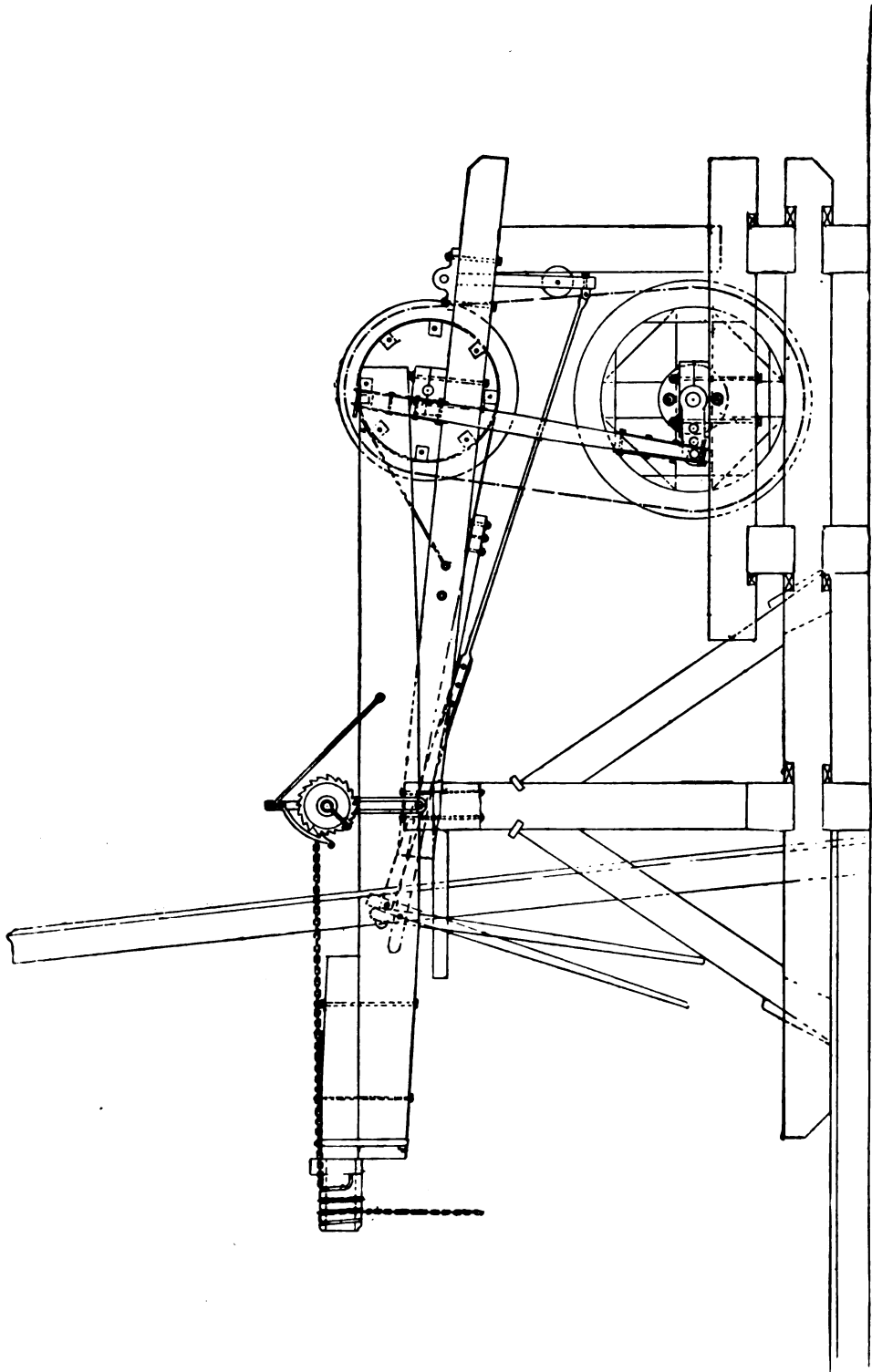
FIGURE 23 A.



The figures following give enlarged views. The Boiler, Engine, and many of the tools are the same as those used with cable. This system is not recommended for drilling deep wells.

SIDE ELEVATION.

FIGURE 23 B.



GROUND PLAN.

FIGURE 23 C.

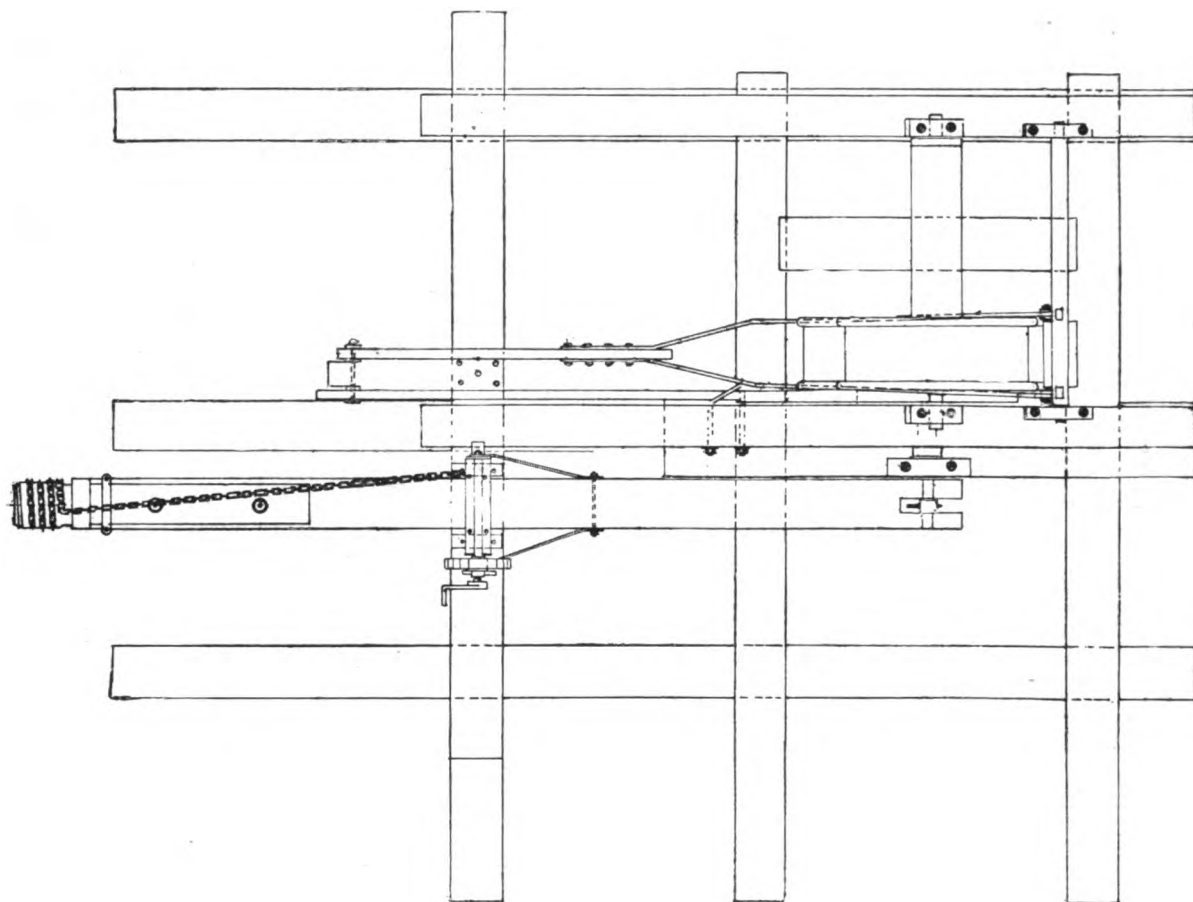
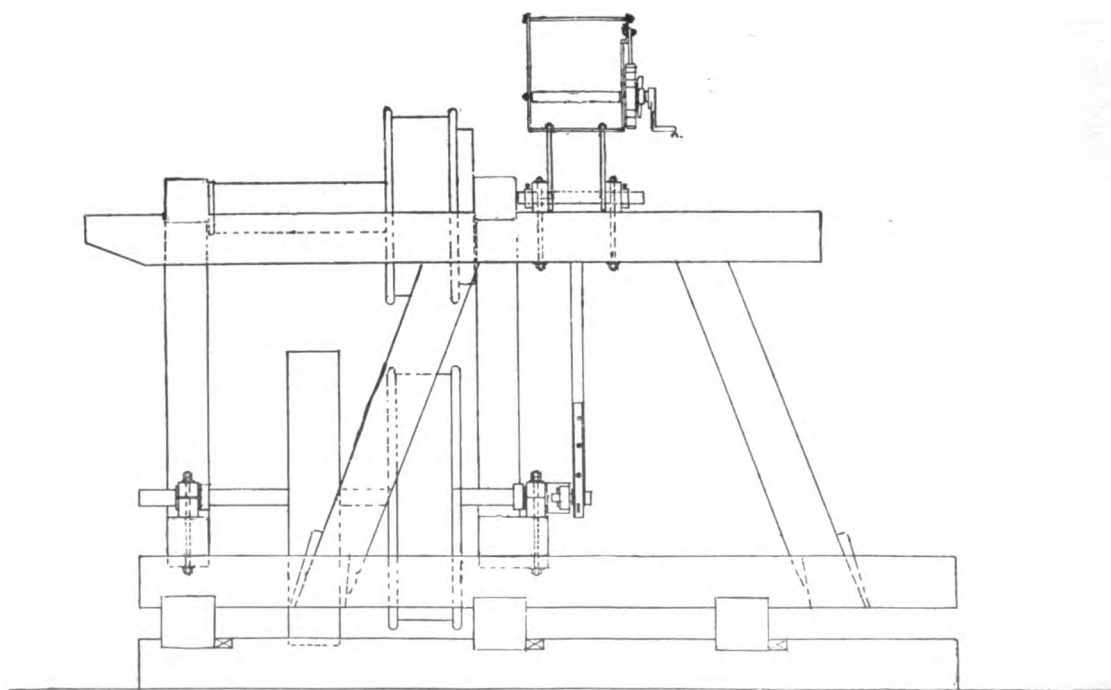
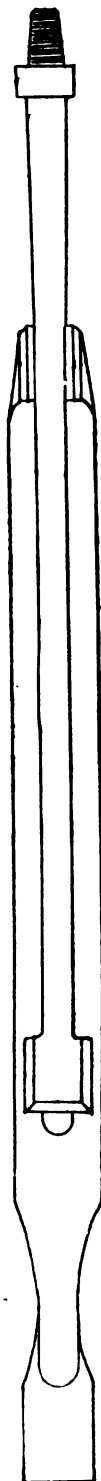
**END ELEVATION.**

FIGURE 23 D.

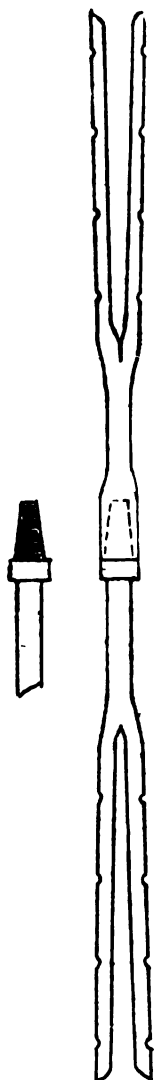


CANADIAN POLE TOOLS.

JARS.
FIGURE 23 G.



DRILLING POLE
JOINT
FIGURE 23 E.



TO UNITE THE
WOODEN
POLES.

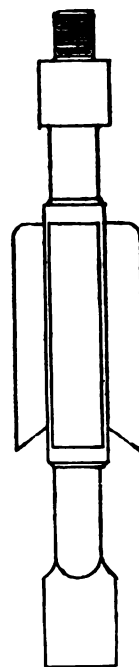
AUGER STEM.
FIGURE 23 F.



POLE STRAPS.
FIGURE 23 H.



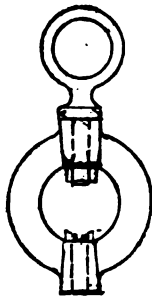
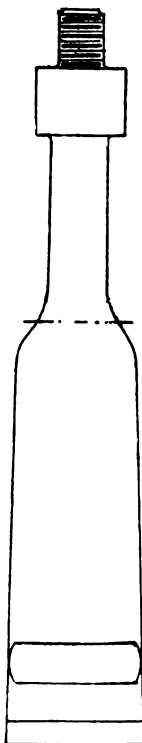
WING GUIDE
AND REAMER.
FIGURE 23 I.



CANADIAN POLE TOOLS.

CANADIAN DRILLING POLE.

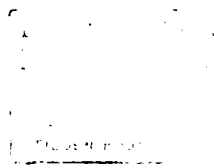
FIGURE 23 J.

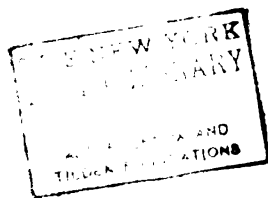
CHAIN SWIVEL
TO DRILL WITH.
FIGURE 23 K.SWIVEL FOR
RAISING POLES.
FIGURE 23 L.BIT.
FIGURE 23 N.SUBSTITUTE.
FIGURE 23 M.

BAILER.

FIG. 23 O. FIG. 23 P.



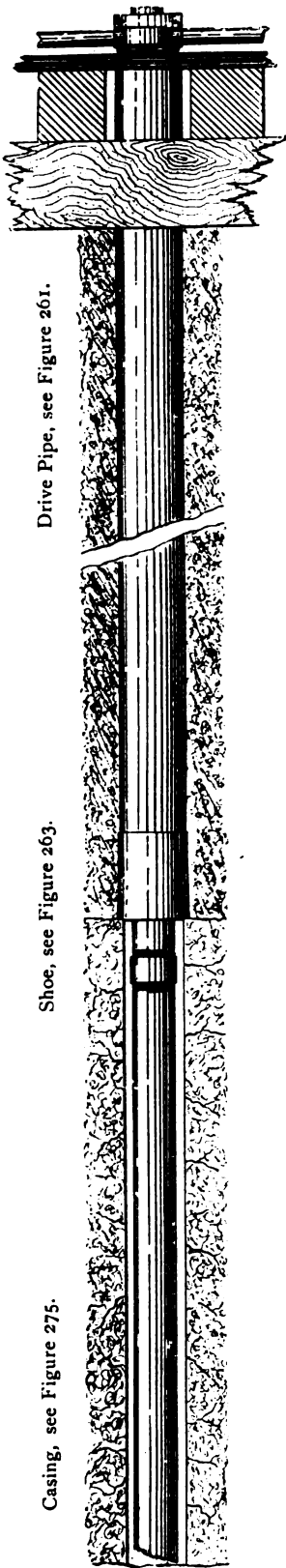




IDEAL SECTION OF A PUMPING WELL.

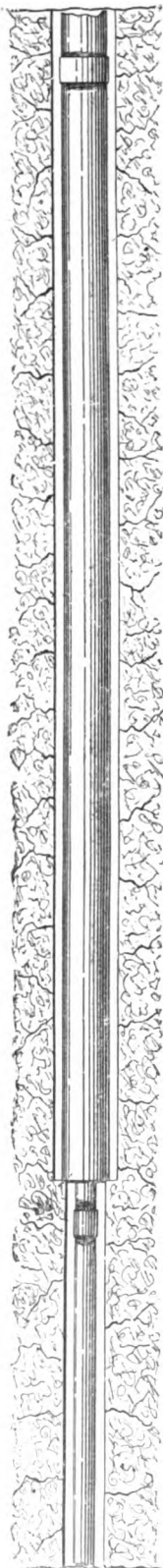
CASING HEAD, GAS PIPES,
DERRICK FLOOR,
DERRICK SILLS, DRIVE
PIPE, CASING.

FIGURE 24.



CASING AND TUBING.

FIGURE 25.



TUBING, SUCKER
RODS, WORKING BAR-
REL, VALVES AND
ANCHOR.

FIGURE 26.

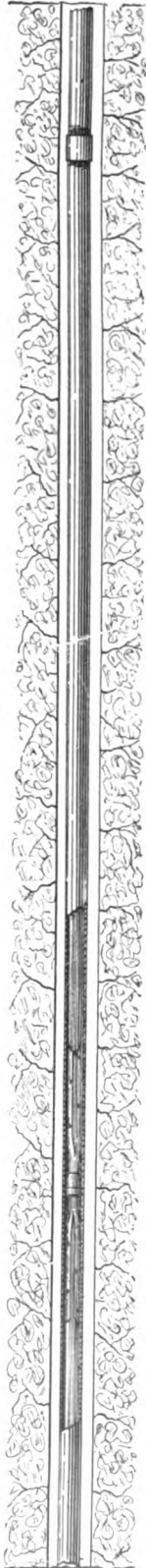
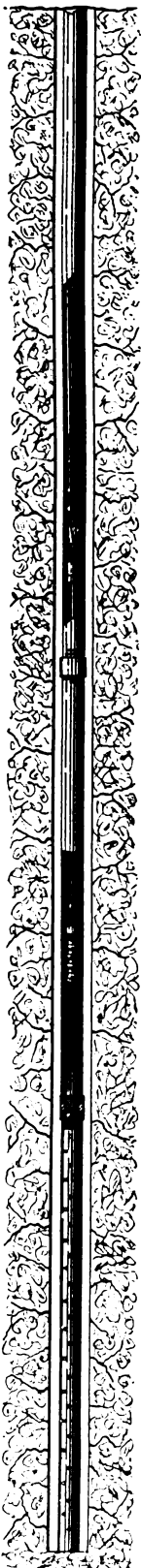


FIGURE 27.



Drive Pipe, see Figure 261.

Shoe, see Figure 263.

Casing, see Figure 275.

Casing, see Figure 275.

Tubing, see Figure 301.

Tubing, see Figure 301.

Sucker Rods, see Figure 322.

Sucker Rods, see Figure 322.

Valves in Working Barrel,

see Figure 361.

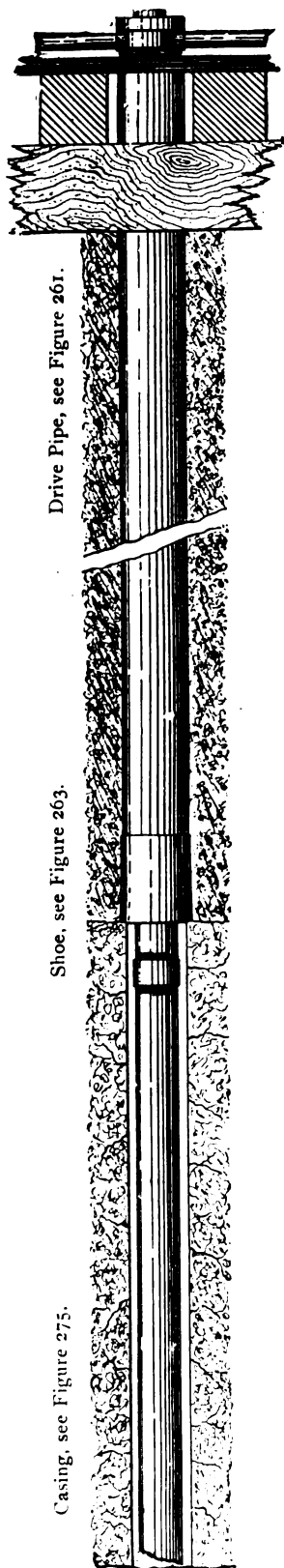
Perforated Pipe or Anchor,

see Figure 305.

IDEAL SECTION OF A FLOWING OIL WELL.

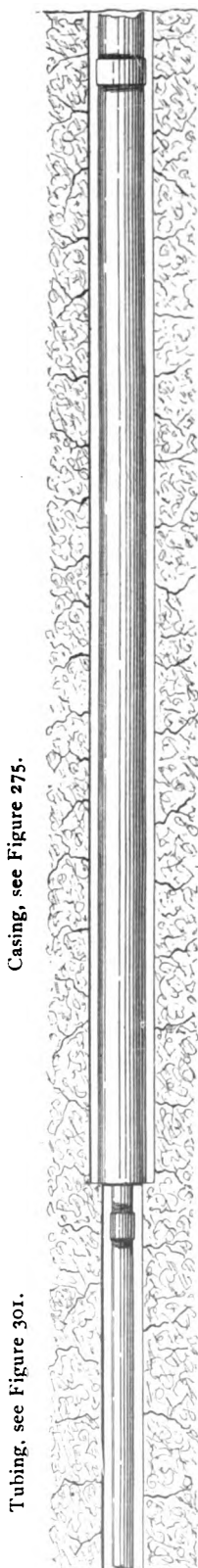
CASING HEAD, GAS PIPES,
DERRICK FLOOR, DER-
RICK SILLS, DRIVE
PIPE, CASING.

FIGURE 24.



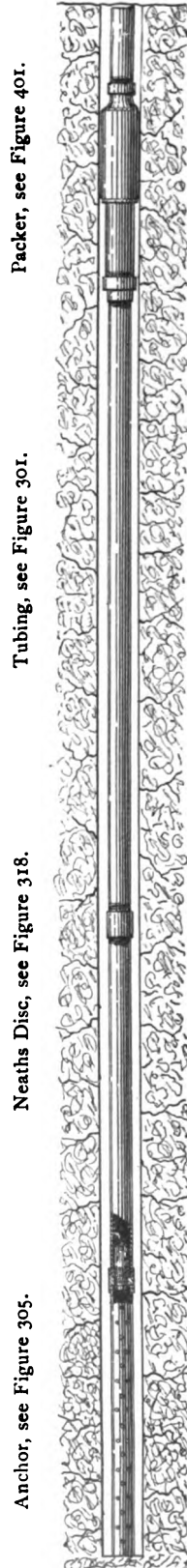
CASING AND TUBING.

FIGURE 25.



TUBING, PACKER AND
ANCHOR.

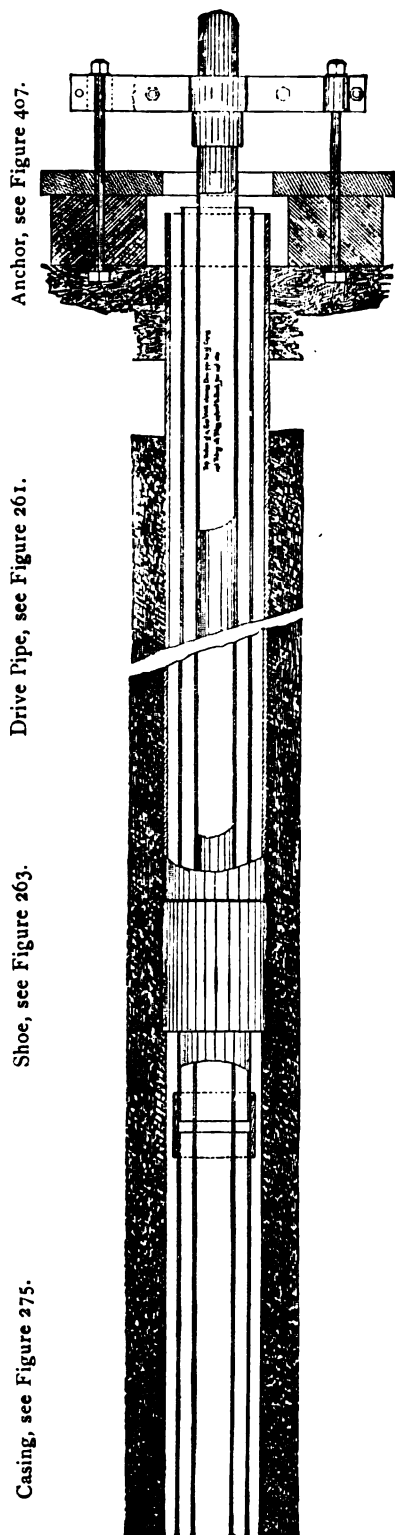
FIGURE 28.



IDEAL SECTION OF A GAS WELL.

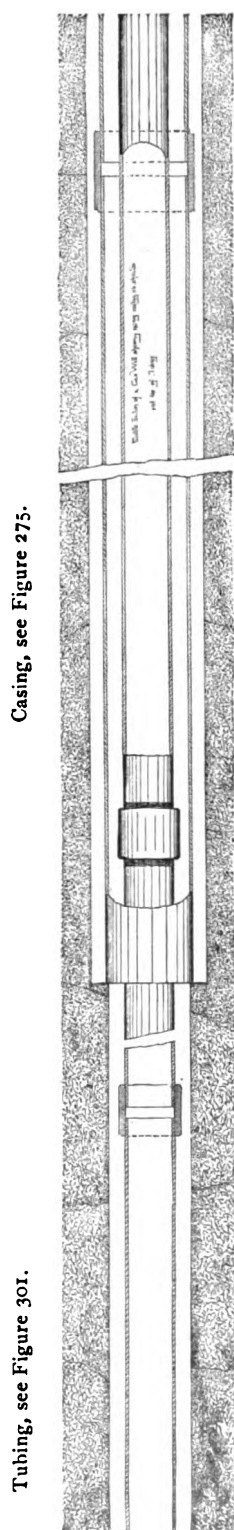
ANCHOR, TUBING, DERRICK
FLOOR, DERRICK SILLS,
DRIVE PIPE, CASING.

FIGURE 28 A.



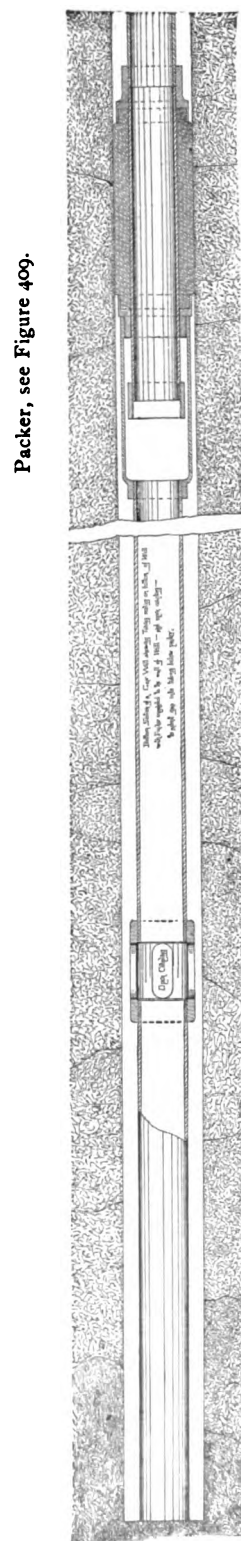
CASING AND TUBING.

FIGURE 28 B.



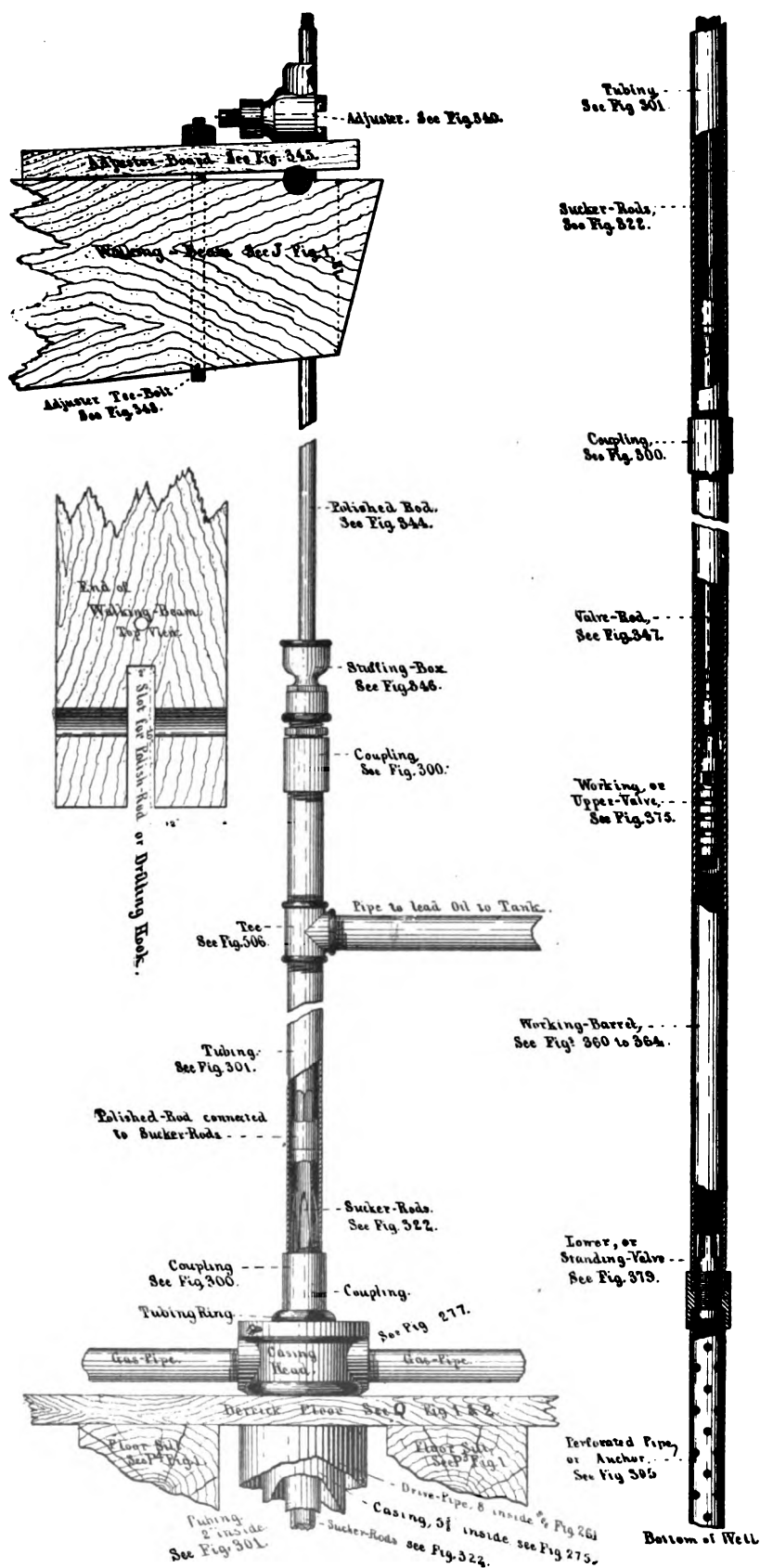
TUBING AND PACKER.

FIGURE 28 C.



PUMPING WELL.

FIGURE 29.

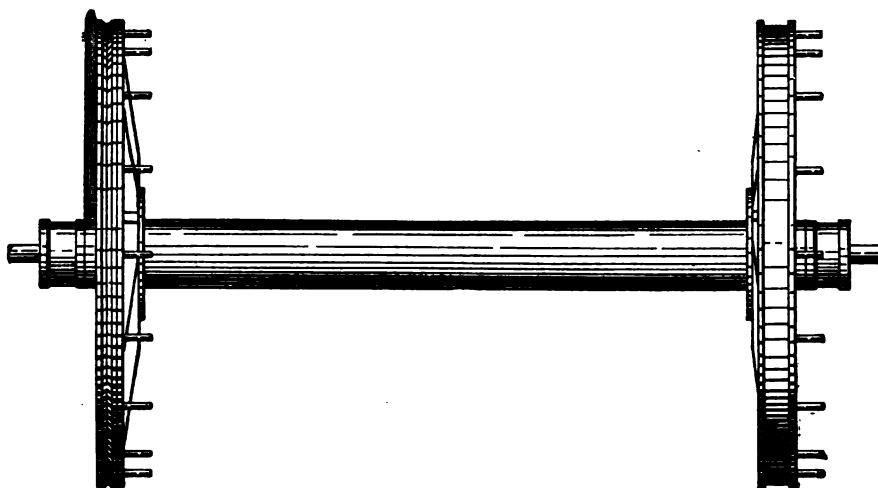


Showing everything used in pumping an oil well, and how the parts are connected together.

PARTS OF RIG.

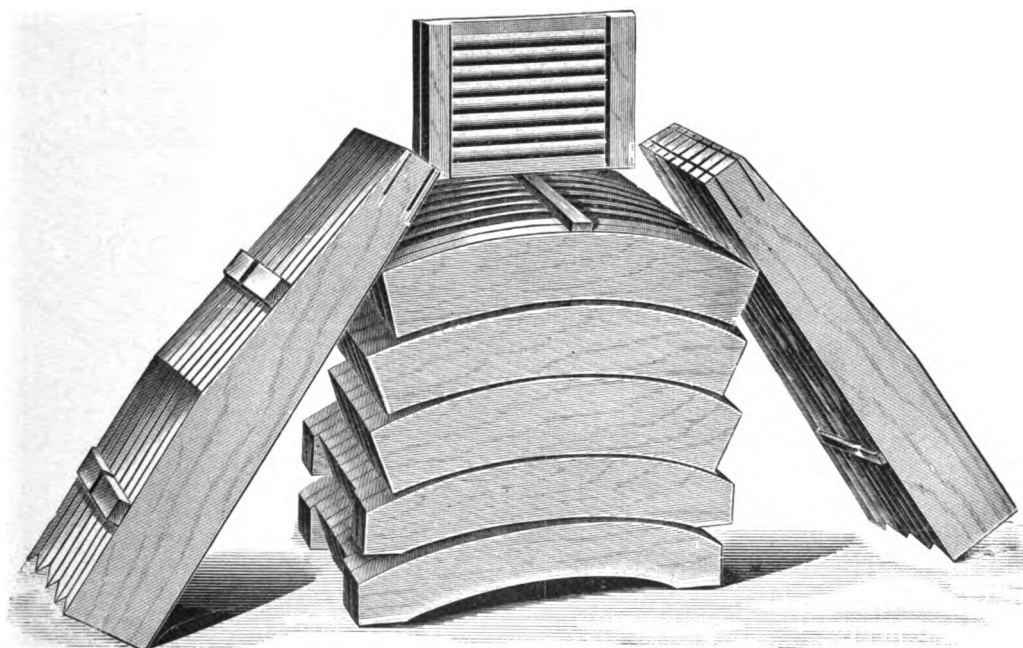
COMMON BULL WHEELS.

FIGURE 30.



SET OF CANTS, ARMS AND PINS FOR COMMON BULL WHEELS.

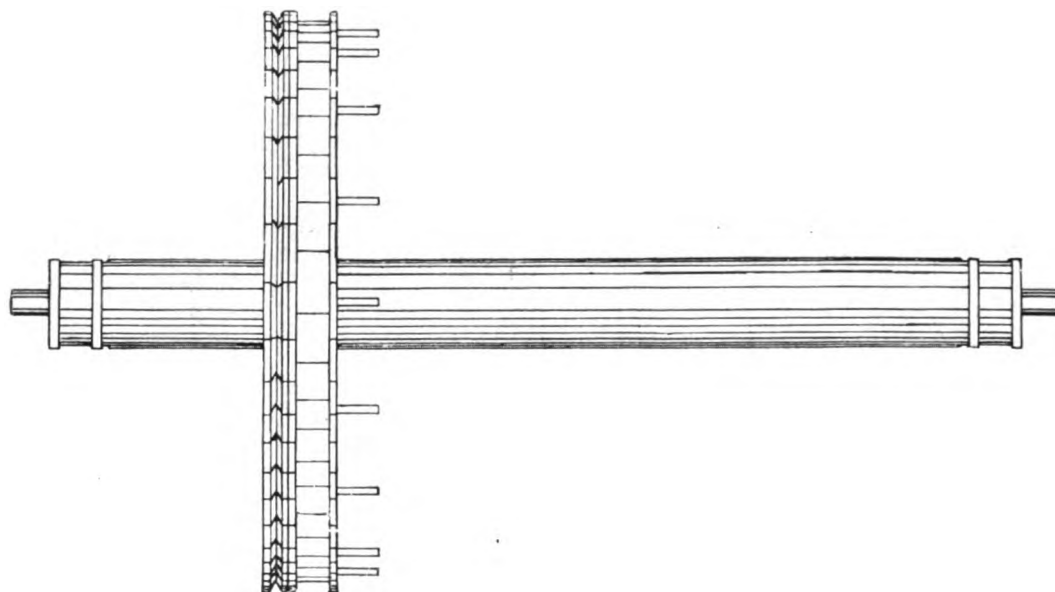
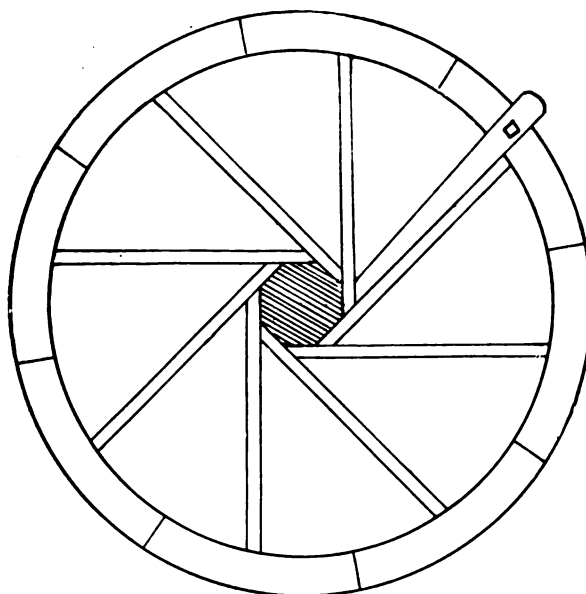
FIGURE 30 A.



BULL WHEELS SHAFT.

FIGURE 30 B.



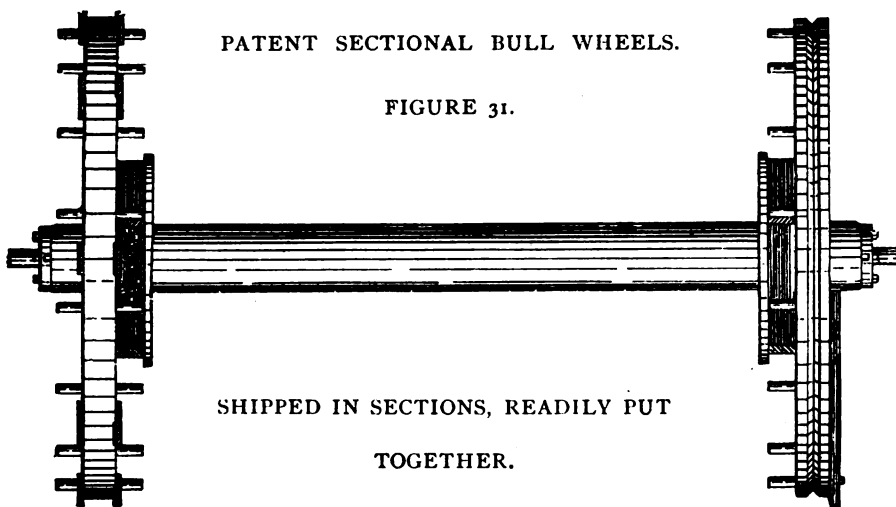
PARTS OF RIG.**EXTRA BULL WHEEL.****FIGURE 30 C.****END VIEW OF EXTRA BULL WHEEL.****FIGURE 30 D.**

See Ground Plan Figure 2 A, for location of extra Bull Wheel, and object of the same.

PARTS OF RIGS.

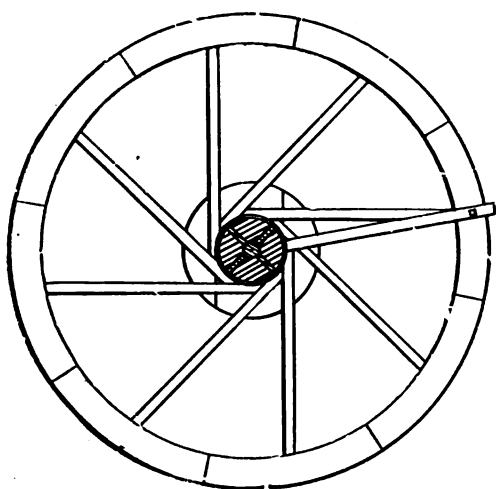
PATENT SECTIONAL BULL WHEELS.

FIGURE 31.



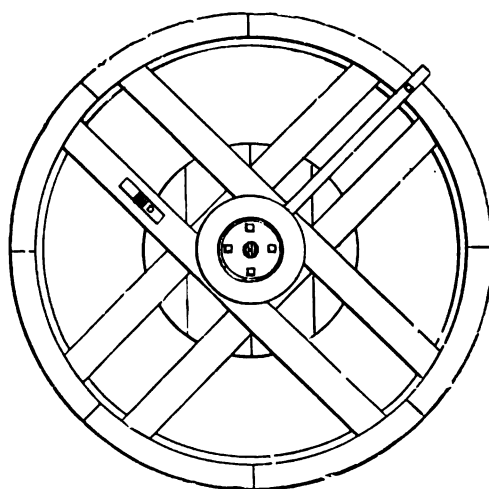
END VIEW OF FIGURE 30 COMMON BULL WHEELS.

FIGURE 32.



END VIEW OF FIGURE 31 SECTIONAL BULL WHEELS.

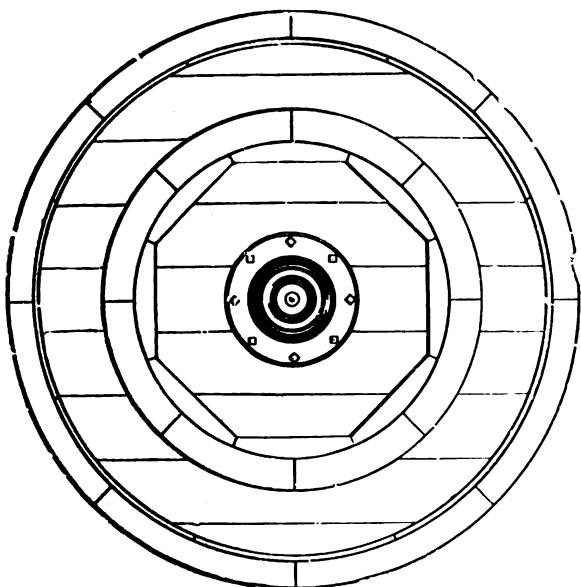
FIGURE 33.



COMMON BAND WHEEL WITH TUG PULLEY COMBINED.

FIGURE 34.

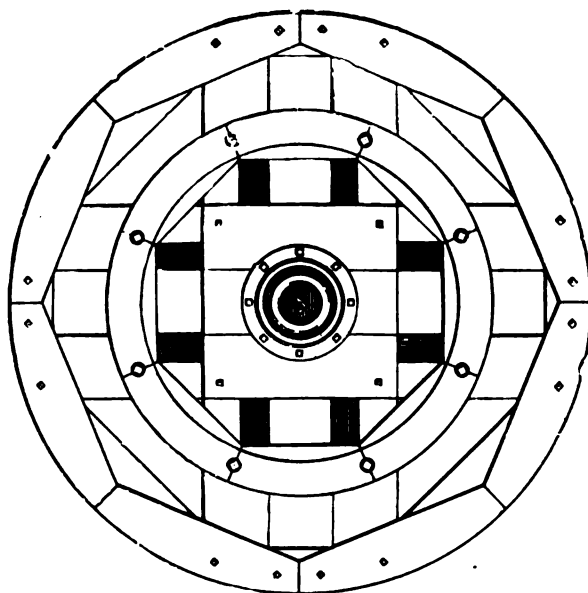
(See Figure 37 for Face View).



PARTS OF RIGS.

PATENT SECTIONAL BAND WHEEL AND
TUG PULLEY COMBINED.

FIGURE 35.



REVERSE SIDE OF FIGURE 35.

FIGURE 36.

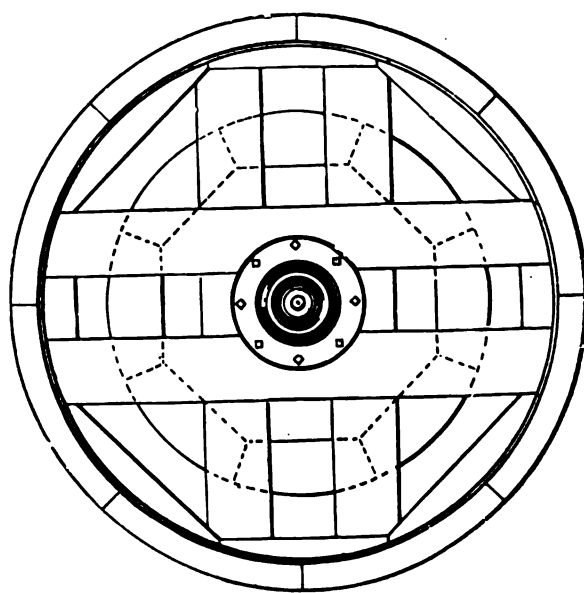
FACE VIEW OF BAND WHEELS.
WITH ONE TUG PULLEY. WITH TWO TUG PULLEYS.

FIGURE 37.

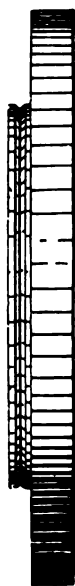


FIGURE 37 A.

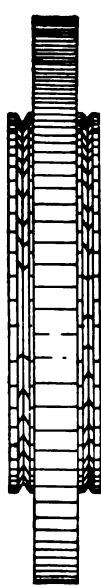
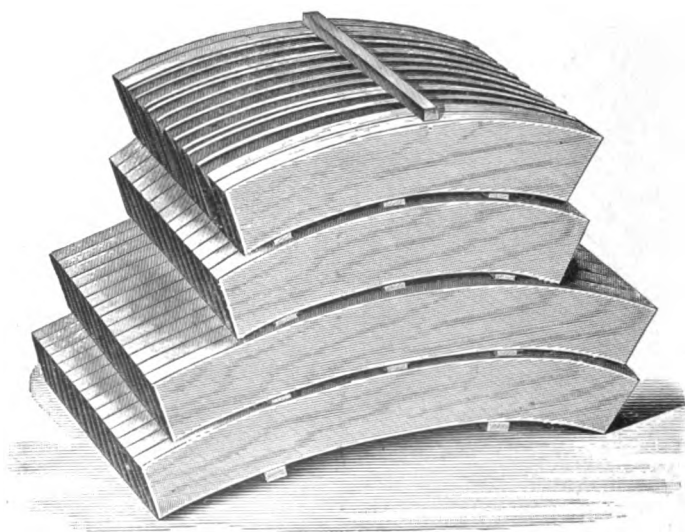
CANTS FOR COMMON BAND WHEEL AND TUG
PULLEY, (FIGURE 34).

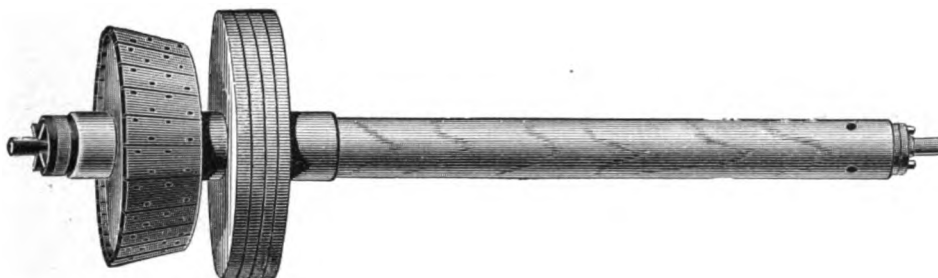
FIGURE 37 B.

To use with extra Bull
Wheel, Fig. 30 C.

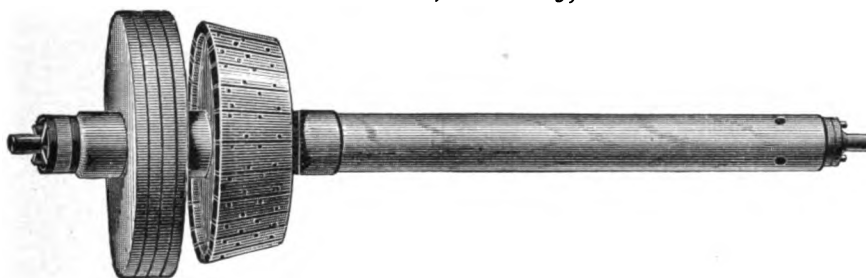
PARTS OF RIGS.

SAND PUMP REELS.

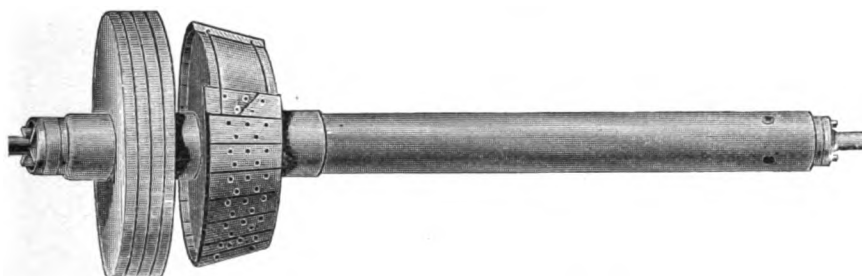
SHORT NOSE, FIGURE 38.



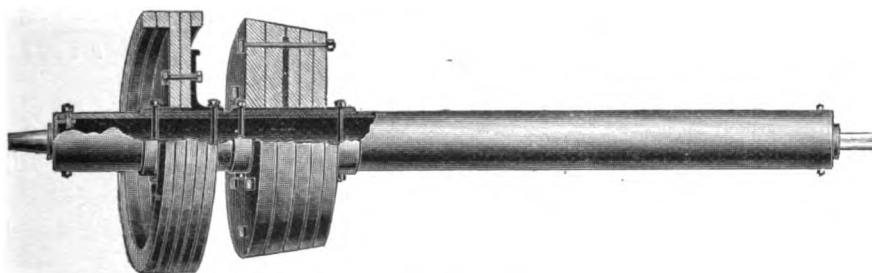
LONG NOSE, FIGURE 39.



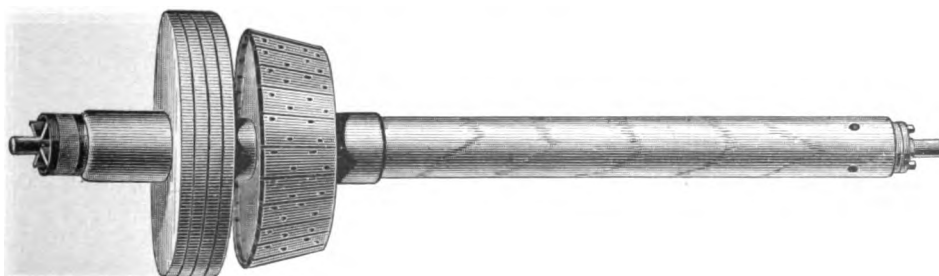
WIRED, FIGURE 39 A.



IRON WITH WOODEN LAGGING, FIGURE 39 B.



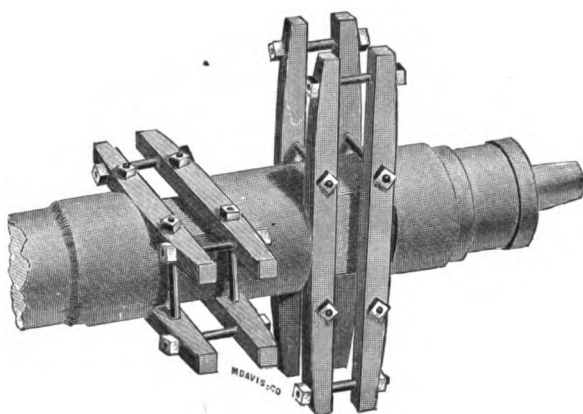
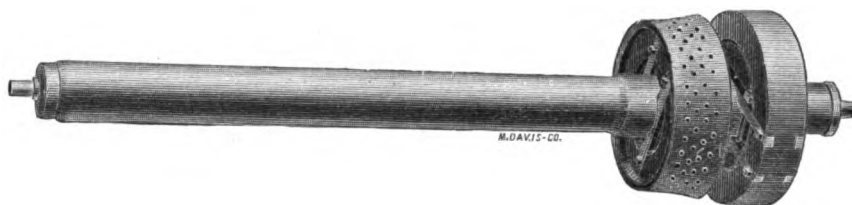
EXTRA LONG NOSE, FIGURE 40.



PARTS OF RIGS.

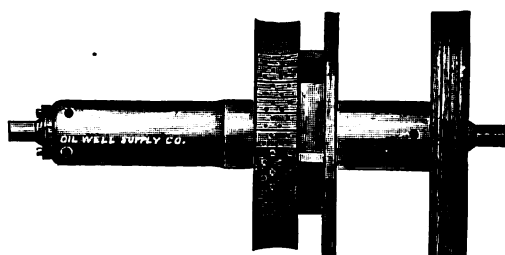
SAND PUMP REELS.

EATON PATENT, FIGURE 40 A.



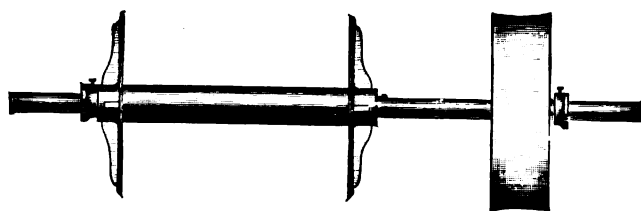
DETAIL VIEW OF
EATON PATENT, FIGURE 40 A.

FIGURE 40 B.



PATENT STRAIGHT LINE SAND
PUMP REEL.

FIGURE 41.



IRON SAND PUMP REEL.

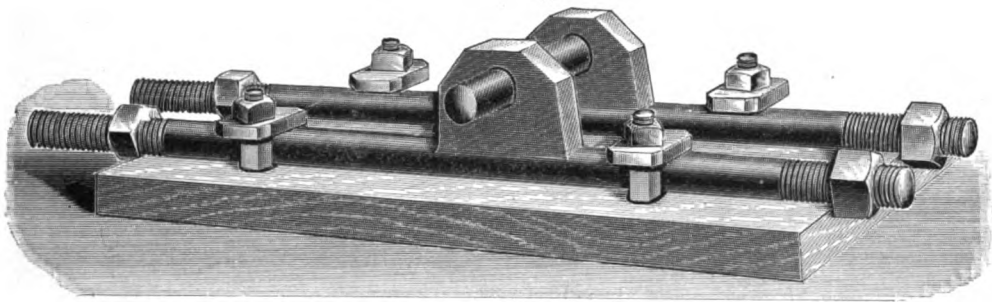
FIGURE 42.

Particularly adapted for hot climates.

PARTS OF SAND REEL.

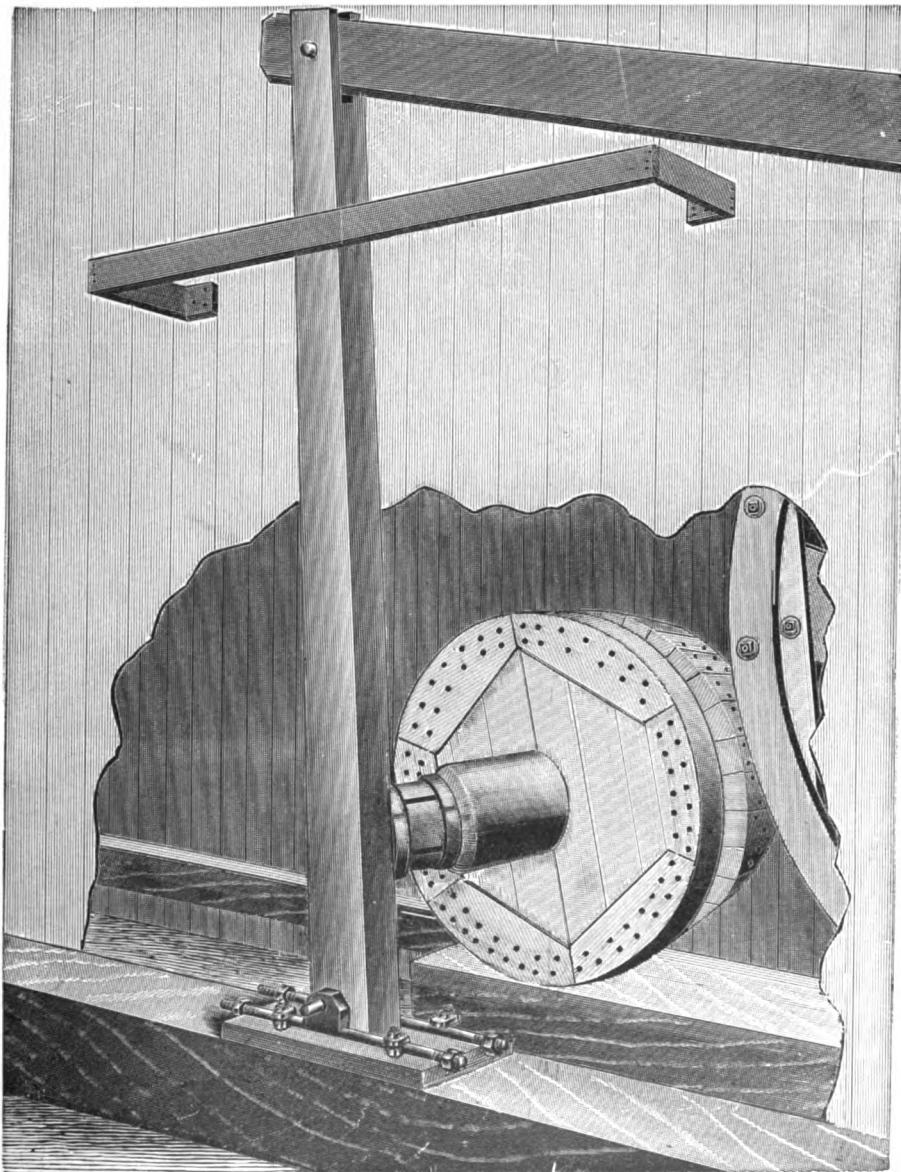
FURMAN'S PATENT ADJUSTABLE SAND REEL CONNECTION.

FIGURE 44.



SAND REEL ARRANGED WITH ADJUSTABLE CONNECTION.

FIGURE 44 A.

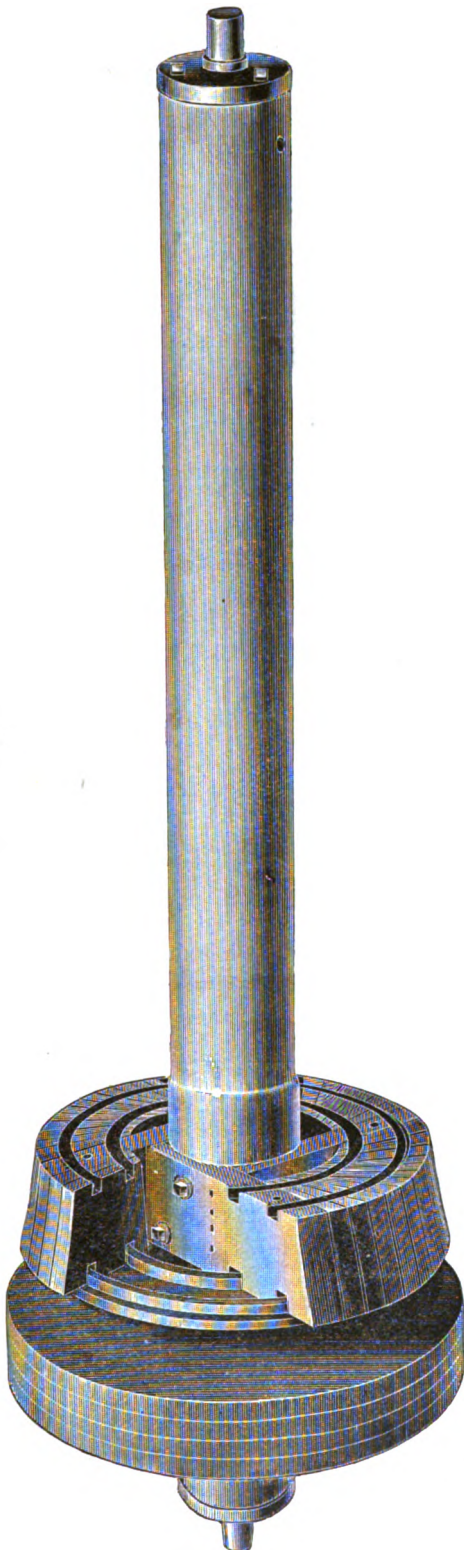


This secures, with certainty and precision, the proper adjustment between the band wheel and the sand reel pulley. As the pulley wears smaller, the adjustment is changed, so that the pulley is kept at its proper point of contact with the band wheel.

The upper guide prevents the lever from getting out of place.

SPECIAL SAND PUMP REEL.
(PATENTED).

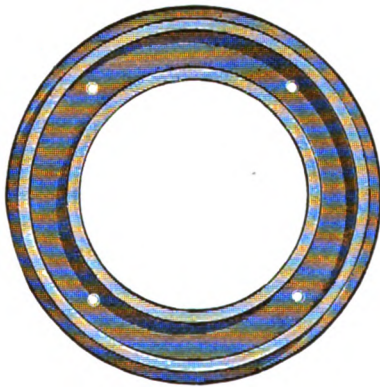
FIGURE 43.



By the ingenious construction of the bevelled pulley the ordinary lagging is dispensed with, and the friction takes place on the ends of the wooden pieces composing the pulley. The pulley is built up in quarters. Much more strength and greater durability are thereby secured.

FLANGE.

FIGURE 43 A.



GUDGEONS.

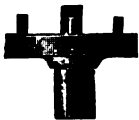
TAPER.

STRAIGHT.

FIGURE 43 B.



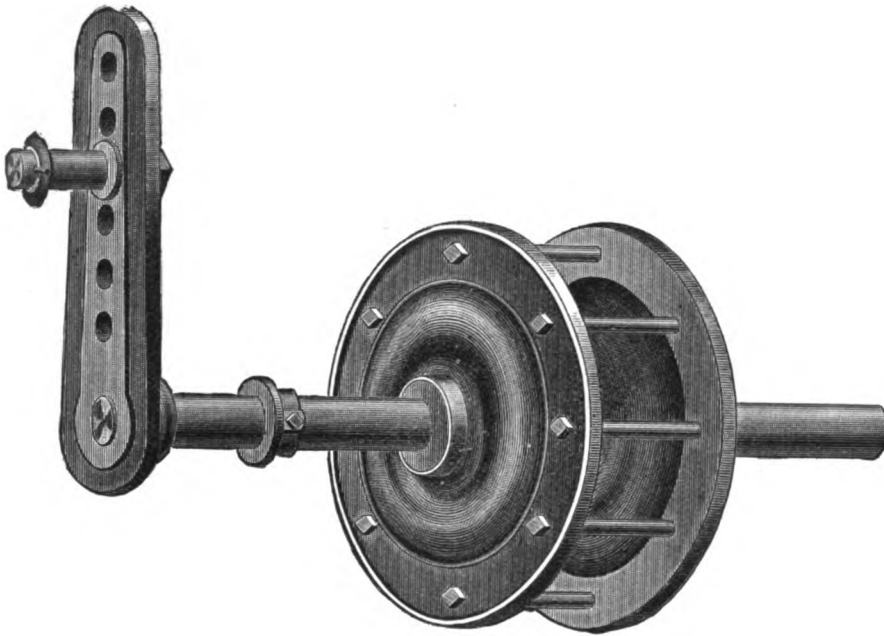
FIGURE 43 C.



PARTS OF RIGS.

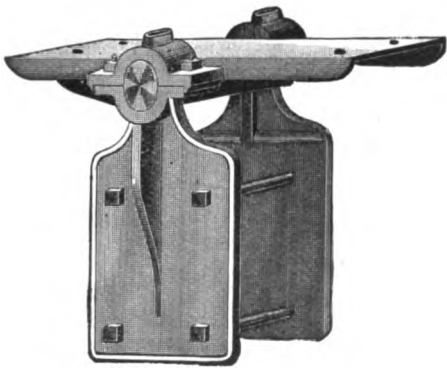
SET OF RIG IRONS,
CRANK SHAFT, PAIR OF FLANGES WITH BOLTS,
WRIST PIN AND COLLAR.

FIGURE 45.



CENTER IRONS COMPLETE.

FIGURE 47.



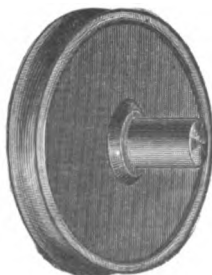
DRILLING HOOK.

FIGURE 49.



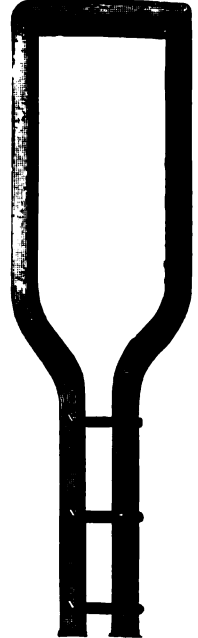
DERRICK OR CROWN PULLEY.

FIGURE 51.



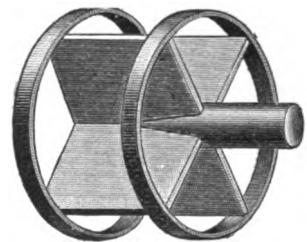
STIRRUP.

FIGURE 46.



GUDGEON WITH BANDS.

FIGURE 48.



SAND PUMP PULLEY.

FIGURE 50.

EXTRA LARGE DERRICK OR
CROWN PULLEY.

FIGURE 53.

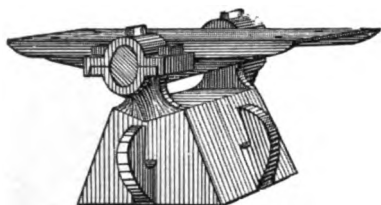


PARTS OF RIGS.

RAIFSNYDERS PATENT CENTER IRONS AND JACK POST BOXES.

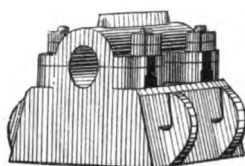
CENTER IRONS.

FIGURE 60.



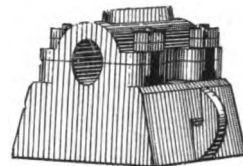
JACK POST BOXES.

FIGURE 61.



FOR 4 GUY RODS.

FIGURE 62.



FOR 2 GUY RODS.

FIGURE 63.

SIDE ELEVATIONS
SHOWING HOW THE
RAIFSNYDERS IRONS
ARE SET AND
FASTENED.

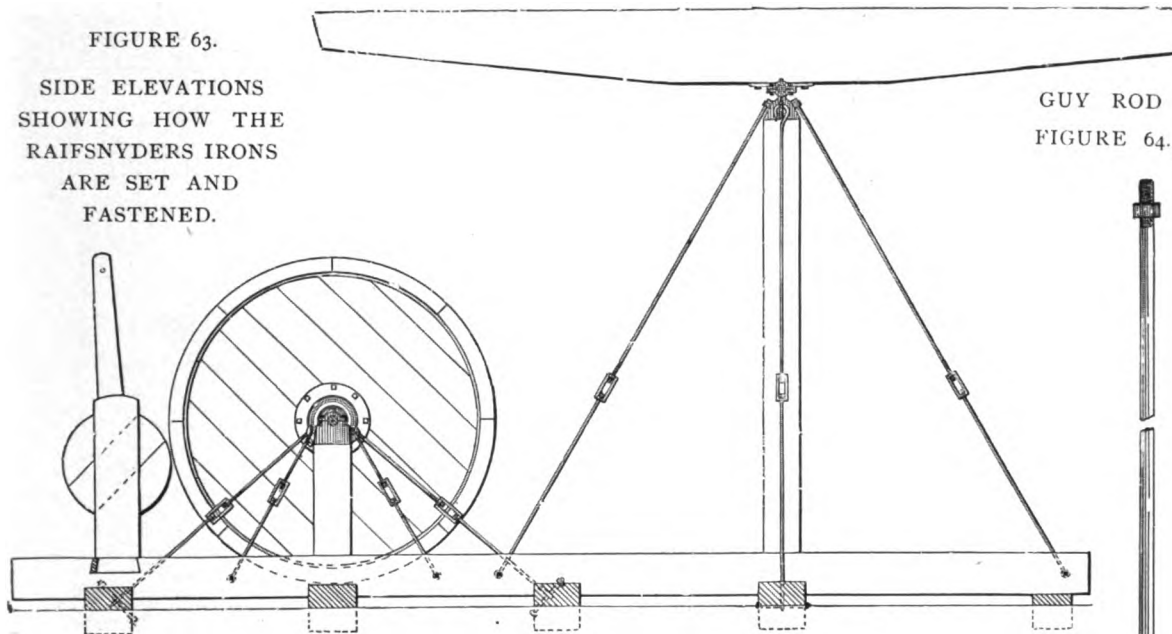
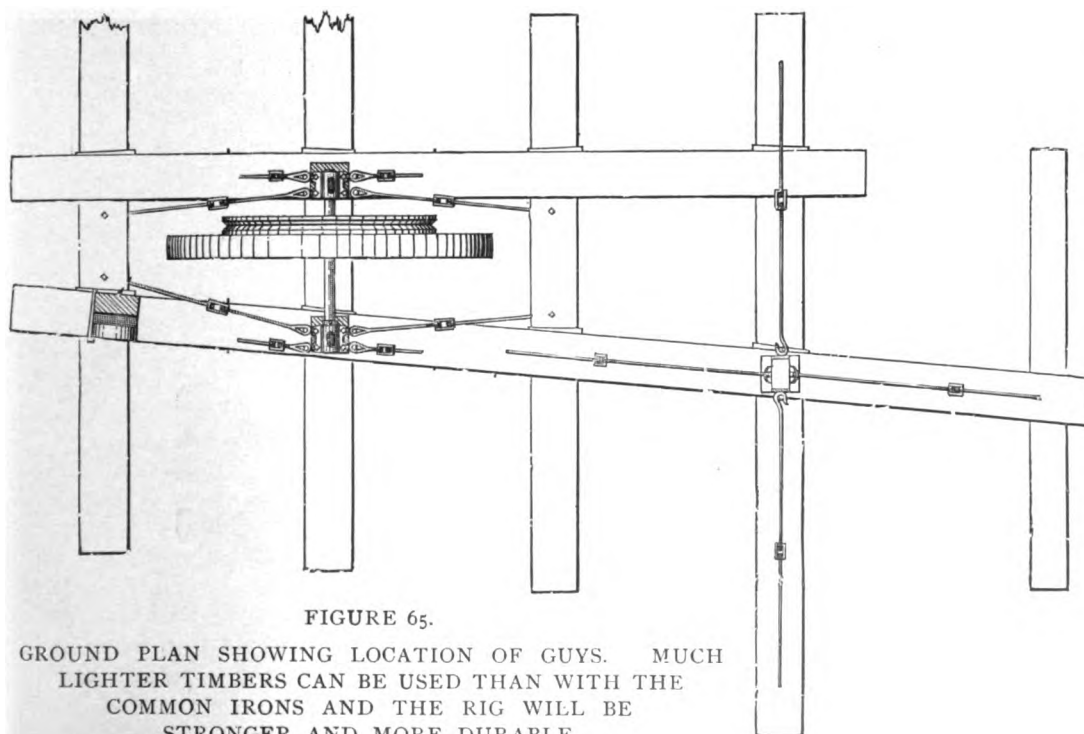
GUY ROD
FIGURE 64.

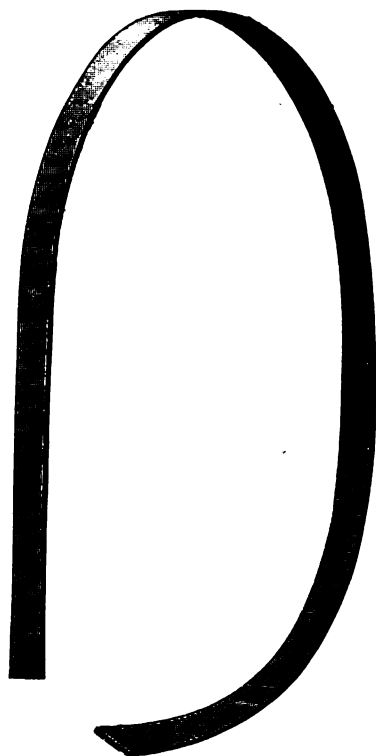
FIGURE 65.

GROUND PLAN SHOWING LOCATION OF GUYS. MUCH
LIGHTER TIMBERS CAN BE USED THAN WITH THE
COMMON IRONS AND THE RIG WILL BE
STRONGER AND MORE DURABLE.

SET OF BRAKE IRONS.

BRAKE BAND.

FIGURE 70.



BRAKE LEVER.

FIGURE 71.



BACK BRAKE.

FIGURE 73.



BULL ROPE COUPLING COMMON.

FIGURE 74.



BULL ROPE COUPLING, ROGERS PATENT.

FIGURE 75.



WITH RATCHET TO TIGHTEN THE TUG ROPE
BY TWISTING IT.

BRAKE STAPLE.

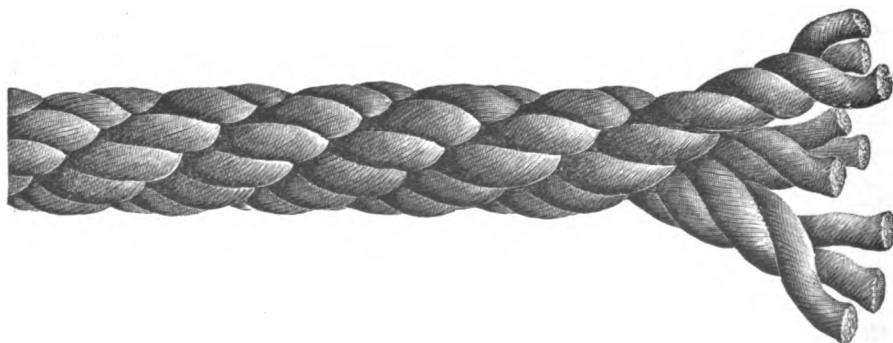
FIGURE 72.



ROPES USED FOR DRILLING WELLS.

DRILLING CABLE, (HAWSER LAID).

FIGURE 76.

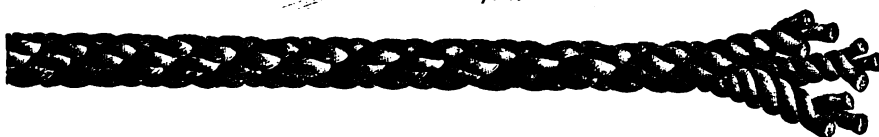


USUAL DIAMETERS, 2", 2½", 2¾", ANY LENGTH TO 4,600 FEET.

ROPE.

SAND LINE, (HAWSER LAID).

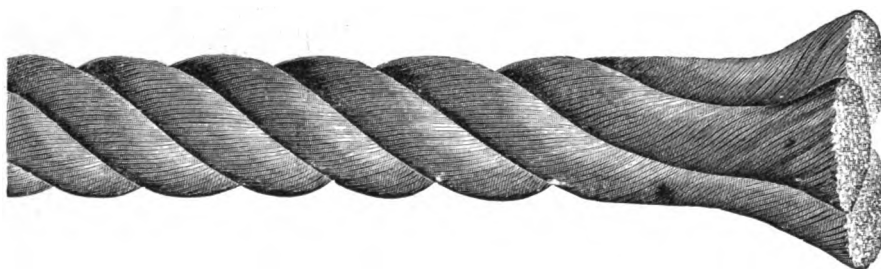
FIGURE 76A.



USUAL DIAMETERS, $\frac{7}{8}$ ", 1", $1\frac{1}{8}$ ".

BULL ROPE (PLAIN LAID).

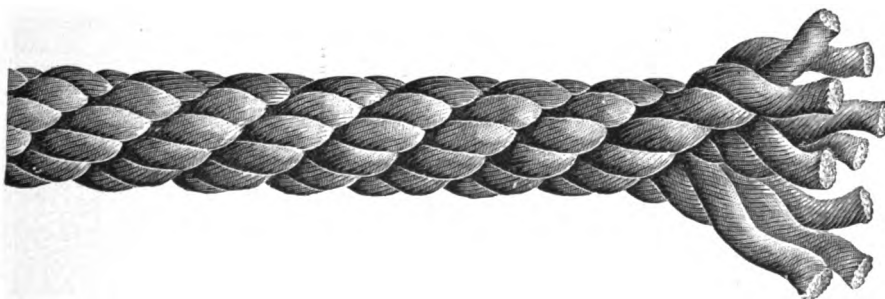
FIGURE 76B.



USUAL DIAMETERS, $2\frac{1}{8}$ ", $2\frac{1}{4}$ ", $2\frac{1}{2}$ ".

TUBING LINE (HAWSER LAID).

FIGURE 76C.



USUAL DIAMETERS 2", $2\frac{1}{8}$ ", $2\frac{1}{4}$ ".

SUCKER ROD LINE (HAWSER LAID).

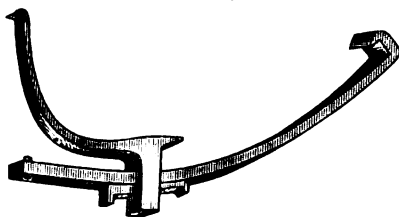
FIGURE 76D.



USUAL DIAMETERS, $1\frac{1}{2}$ ", $1\frac{3}{4}$ ".

BELTING, Etc.**RUBBER BELTING.****FIGURE 77 A.**

USUAL WIDTH AND LENGTH, 10 INCH. 5-PLY, 85 TO 90 FEET LONG.

BELT CLAMPS.**FIGURE 77.****BELT CLAMPS WITH SECTION OF BELT.****FIGURE 78.****BELT PLACER.****FIGURE 78 A.**

ATTACHED TO PULLEY OF ENGINE TO DRAW BELT ON.

PATENT BELT PUNCH AND WRENCH.**FIGURE 78 B.**

TO CUT HOLES IN BELT FOR BOLTS OF CLAMP AND TO TURN THE NUTS.

TORPEDOES.

TORPEDO.

FIGURE 79.



To use with Drop Weight and Guide Line.

ANCHOR.

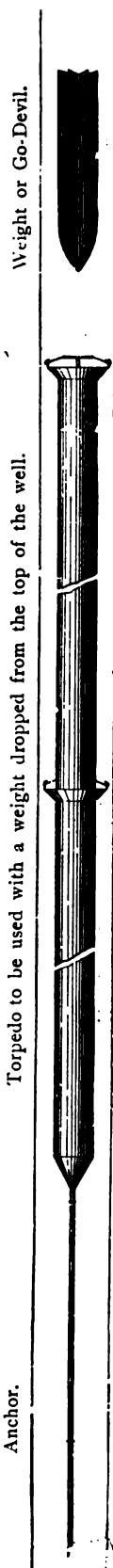
FIGURE 85.



In lengths to suit intended location of Torpedo.

TORPEDO IN WELL.

FIGURE 83.



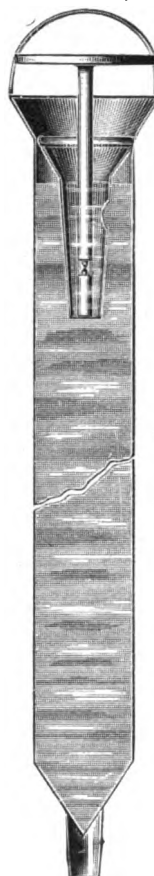
Weight or Go-Devil.

Torpedo to be used with a weight dropped from the top of the well.

Anchor.

TORPEDO.

FIGURE 84.

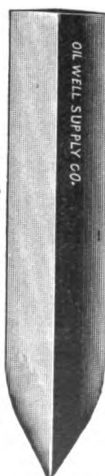


To use with Go-Devil.

Is lowered with a line, and the line drawn out.

GO-DEVIL.

FIGURE 86.

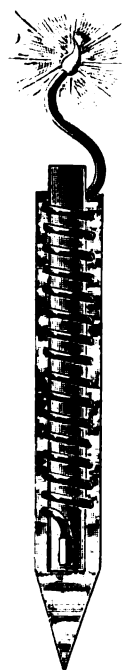


To fire the Torpedo.

Is dropped in the well after Torpedo is lowered to place.

JACK SQUIB.

FIGURE 87.



A small Torpedo used to set off large one

when it cannot be fired in any other way.

Dropped in Well.

LINE SQUIB.

FIGURE 88.

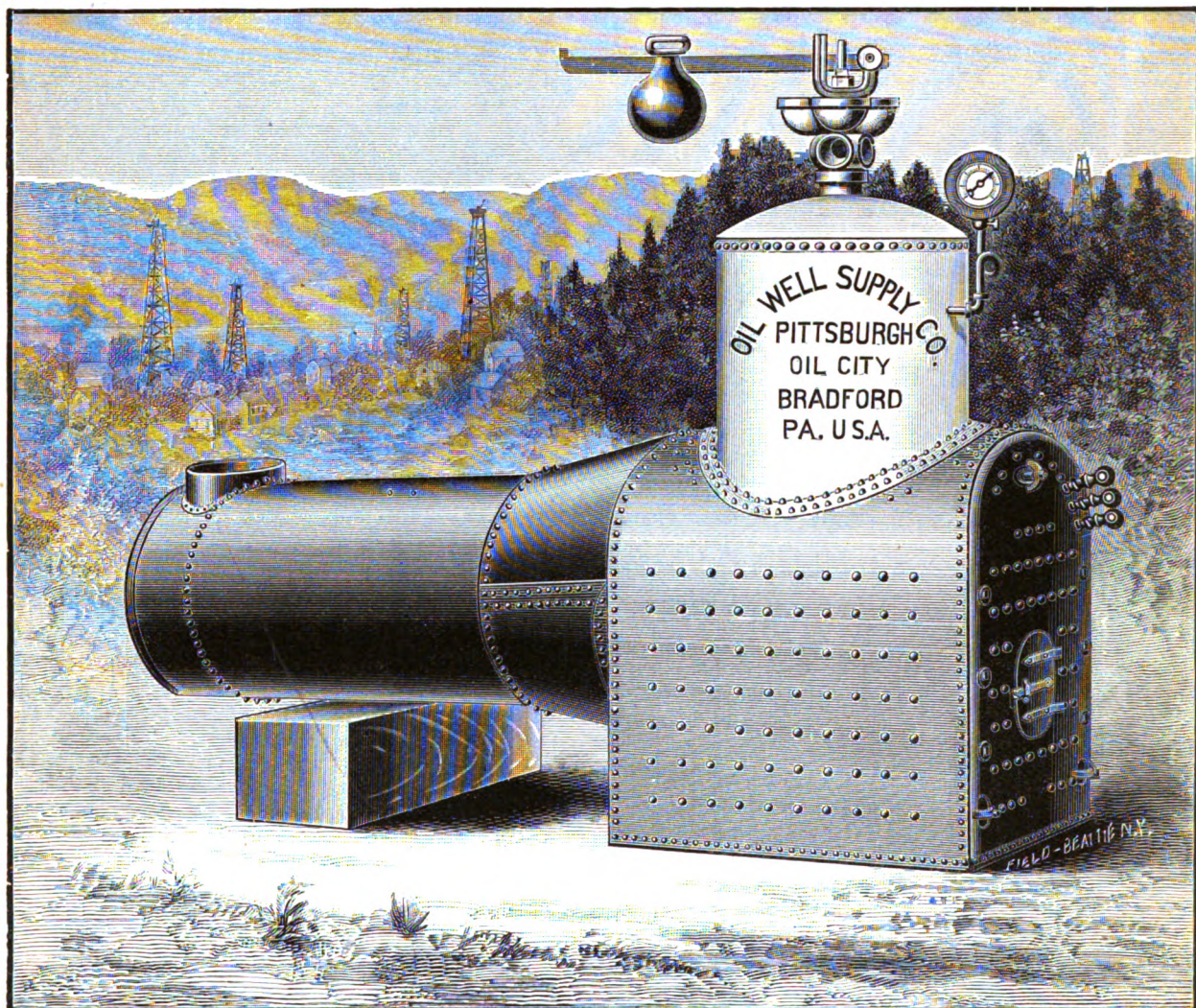


Same purpose as Figure 87.

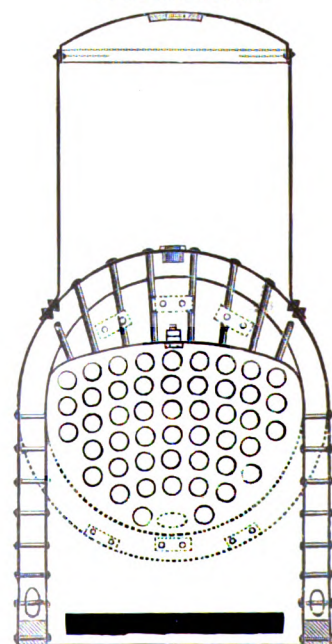
Put in well with a line.

DRILLING BOILER, "WHITE DOME."

FIGURE 100.



CROSS SECTION.
FIGURE 100 A.



These boilers are larger than other makes for the same power.

They are of the style universally used in the Oil Regions.

They are made of open hearth flange steel, having a tensile strength of 60,000 pounds per square inch, an elastic limit of 30,000 pounds, elongation of 20 per cent. in an 8 inch section, and will reduce in area 45 to 50 per cent., and turn over and close down solid when cold *without fracture*, will do the same after heating and plunging into cold water and *will not blister*.

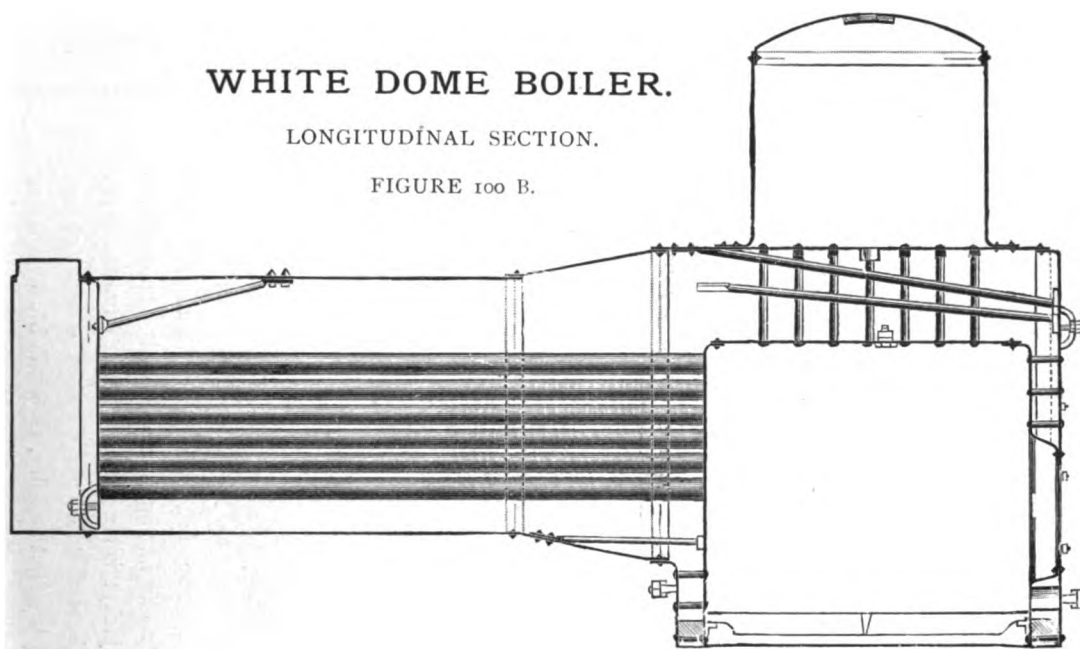
These boilers have unusual fire box surfaces, and storage room for steam. They are *double riveted* in the longitudinal seams. They do not foam or prime under any ordinary circumstances, even with quite foul water.

Every boiler is tested and inspected at 150 pounds hydrostatic pressure per square inch.

WHITE DOME BOILER.

LONGITUDINAL SECTION.

FIGURE 100 B.



SPECIFICATIONS OF WHITE DOME BOILERS.

DOME HEADS DISHED.

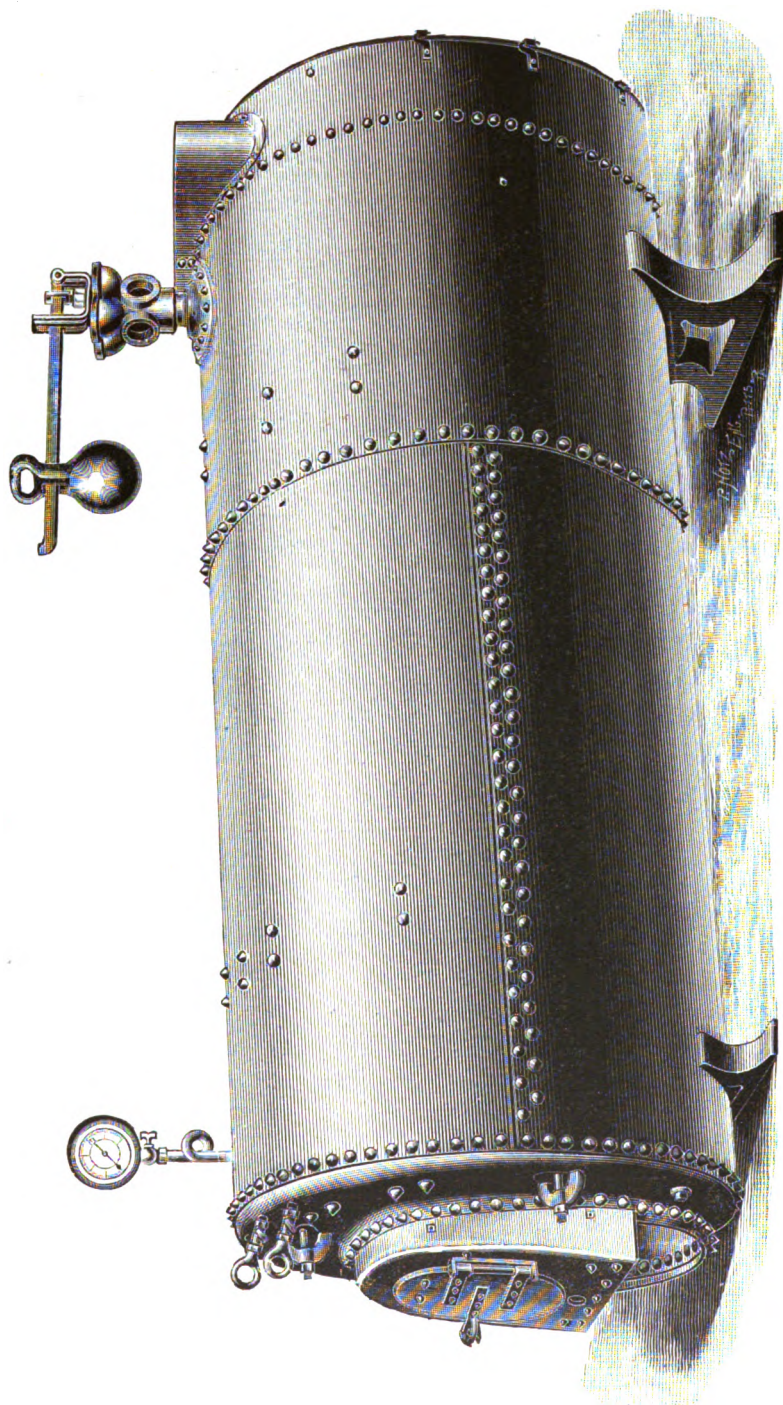
Stay bolts $\frac{7}{8}$ of an inch in diameter placed 5 inches apart. Rivets $\frac{3}{4}$ of an inch in diameter, spaced about 3 inches in double riveted joints, and about 2 inches in single riveted joints.

Horse Power as rated in Oil Country,	-	-	15	20	25	35	40
" " actual rating,	-	-	18½	24½	30¾	38½	44
Diameter of Boilers,	-	-	Inches, 32	36	40	44	44
Length of Furnace Inside,	-	-	" 48	50	50	54	54
Width " " " "	-	-	" 32	36	40	44	44
Height " above Grate,	-	-	" 34	36	40	44	44
Number of 3 inch Tubes,	-	-	- 29	38	48	54	60
Length of Tubes,	-	-	Inches, 90	96	96	108	114
Height of Dome,	-	-	" 24	34	36	36	36
Diameter of Dome,	-	-	" 24	34	36	36	36
Thickness of Shell,	-	-	" 1¼	1¼	1¼	9/32	9/32
" " Flue Sheet,	-	-	" 3/8	3/8	3/8	3/8	3/8
" " Dome Sheet, Head and Front of Boiler,	-	-	" 5/16	5/16	5/16	5/16	5/16
" " Crown Sheet, Furnace Sides, Wagon Top and Sides,	-	-	" 1/4	1/4	1/4	1/4	1/4
Length of Stacks, 25 feet, diameter,	-	-	" 16	18	20	22	24
Thickness of Stack,	-	-	B Wire Gauge, 16	16	16	16	16
Heating Surface,	-	-	Square Feet, 222	298	369	463	528
Length of Boilers,	-	-	Feet, 13	14	14	15½	16
Height of Boilers,	-	-	" 7	7	8	8½	8½
Circumference of Bonnet,	-	-	Inches, 58	62	70	76	84
Weight of Stack,	-	-	(about,) Pounds, 350	400	475	575	575
" " Boilers	-	-	(about,) " 5100	5900	7000	8500	10300
" " Fixtures,	-	-	(about,) " 875	1000	1100	1400	1500
Total Weight,	-	-	(about,) " 5975	6900	8100	9900	11800
" " " " " "	-	-	(about,) Kilos, 2700	3100	3680	4500	5350

DOMELESS BOILER.

(PATENTED).

FIGURE 102.

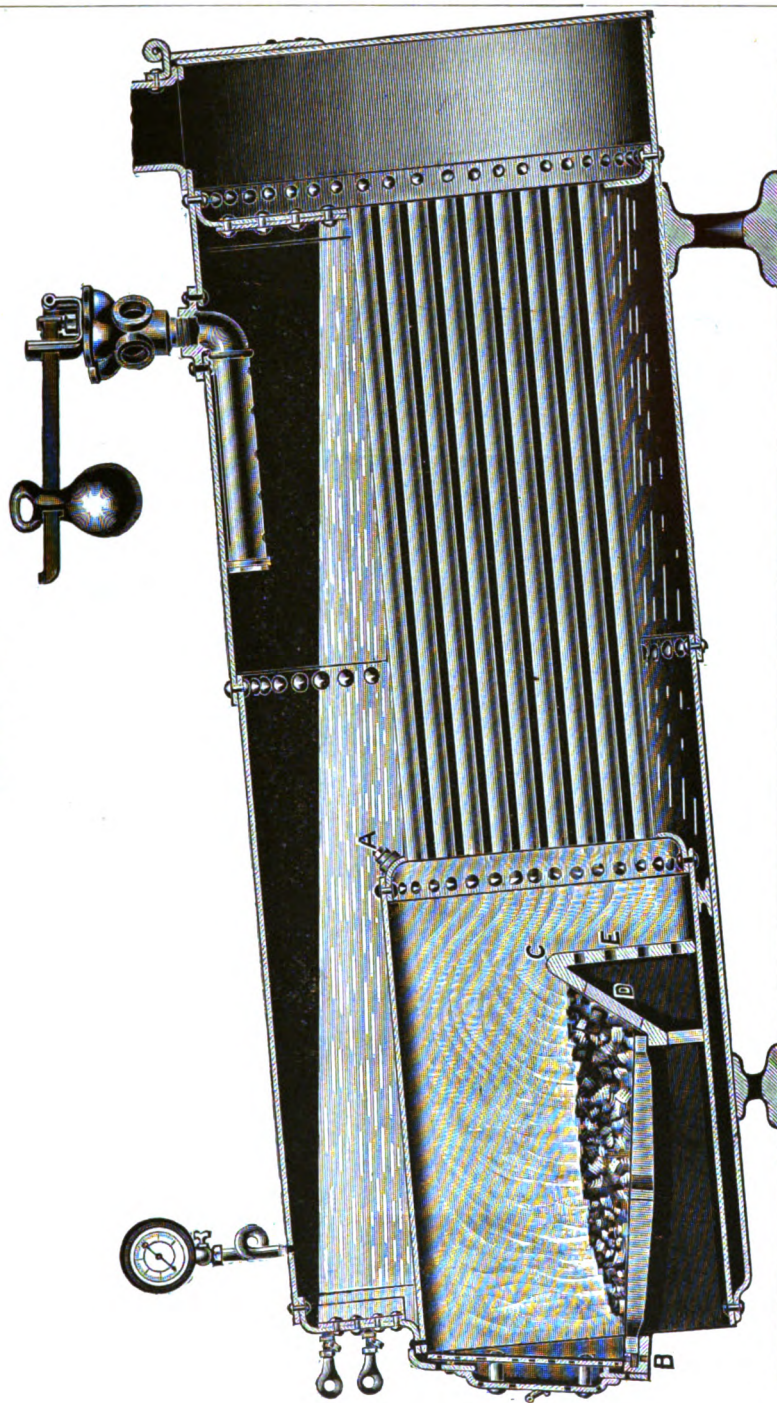


The Domeless Boiler is a distinct advance in the art. The steam is kept much hotter and more elastic, and the boiler is stronger. Stay bolts, not being required, do not form any obstructions and the boiler can be much more easily cleansed and more readily kept clean. Figure 102 C, shows the Domeless Boiler with Jacket, which jacket is six inches distant from the shell. A longitudinal partition extends between the shell and the jacket. The smoke and heated gases are directed downward and towards the front and over the boiler before escaping into the stack. The steam is thus kept hot and dry, all available heat being utilized. This boiler is handy to move, stands firmly, is very strong and economizes fuel.

DOMELESS BOILER.

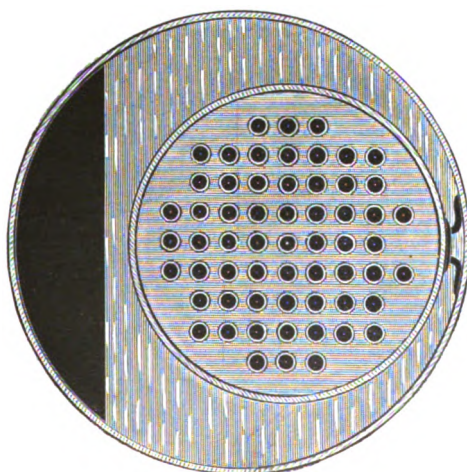
LONGITUDINAL SECTION.

FIGURE 102 A.



CROSS SECTION.

FIGURE 102 B.



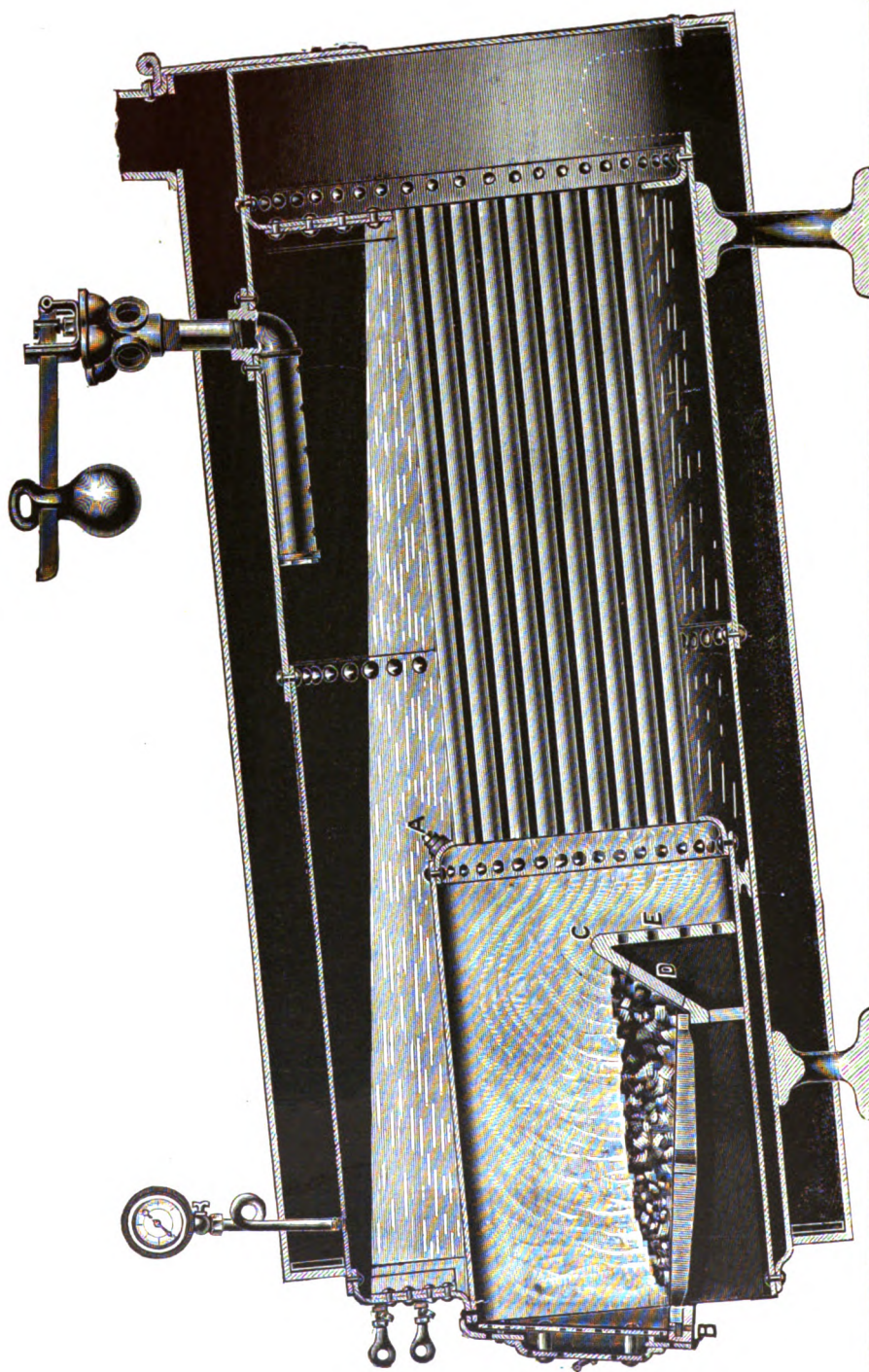
A.—Fusible Plug. *B.*—Perforated Grate Rest. *C.*—Movable Bridge Wall. *D.*—Slots in Bridge Wall. *E.*—Perforations in Back Bridge Wall.

The slots at *D* practically increase the length of the Grate Surface six inches.

HOMELESS BOILER WITH JACKET.

LONGITUDINAL SECTION.

FIGURE 102 C.



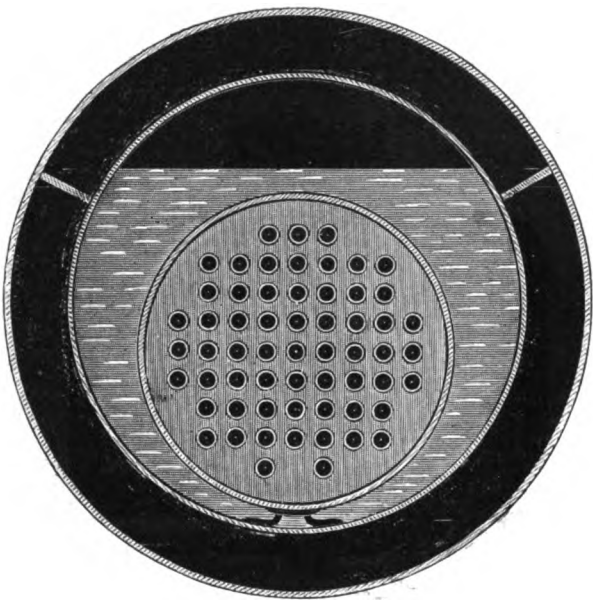
See Figures 102 and 102 A for Description.

When covered with non-conducting material (Asbestos, Hair Felt, &c.,) this boiler for stationary purposes, is as effective, is much cheaper, and more easily connected than any brick set boiler, and more economical in fuel.

DOMELESS BOILER WITH JACKET.

CROSS SECTION.

FIGURE 102 D.



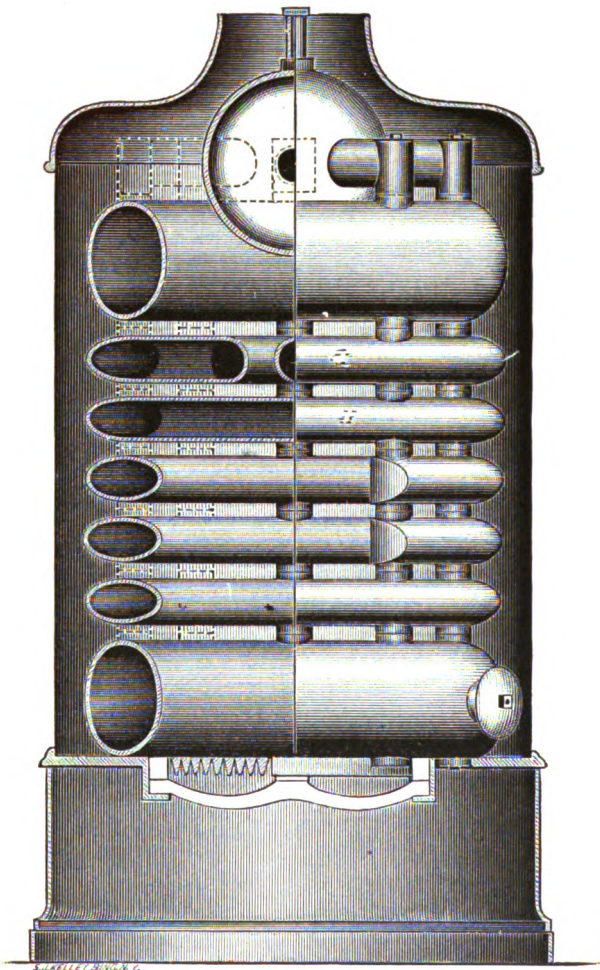
SPECIFICATIONS OF DOMELESS BOILERS.

Horse Power,	-	-	-	-	-	-	-	30	40
Number of Tubes, (All 3-inch,)	-	-	-	-	-	-	-	52	60
Length of Tubes,	-	-	-	-	-	-	Inches,	96	103
Diameter of Boiler,	-	-	-	-	-	-	"	54	54
Diameter of Furnace,	-	-	-	-	-	-	"	36	36
Length of Furnace,	-	-	-	-	-	-	"	48	54
Heating Surface,	-	-	-	-	-	-	Square Feet,	366	474
Thickness of Boiler Shell,	-	-	-	-	-	-	Inches,	5/16	5/16
Thickness of Flue Sheet,	-	-	-	-	-	-	"	3/8	3/8
Thickness of Furnace Sheet,	-	-	-	-	-	-	"	1/2	17/32
Thickness of Boiler Front,	-	-	-	-	-	-	"	3/8	3 8
Diameter of Dry Pipe,	-	-	-	-	-	-	"	4 1/2	5
Length of Smoke Stack,	-	-	-	-	-	-	Feet,	24	24
Diameter of Smoke Stack,	-	-	-	-	-	-	Inches,	22	24
Weight of Smoke Stack,	-	-	-	-	-	-	Pounds,	575	690
Circumference of Bonnet,	-	-	-	-	-	-	Inches,	76	84
Smoke Stack Iron,	-	-	-	-	-	-	B. W. G.	16	16
Weight of Boiler,	-	-	-	-	-	-	About, Pounds,	7000	9000
" " Fixtures,	-	-	-	-	-	-	" "	1200	1500
Total Weight,	-	-	-	-	-	-	" "	8200	10500
" "	-	-	-	-	-	-	" Kilos,	3600	4800

SAFETY UPRIGHT BOILER.

CAST IRON.

FIGURE 103.



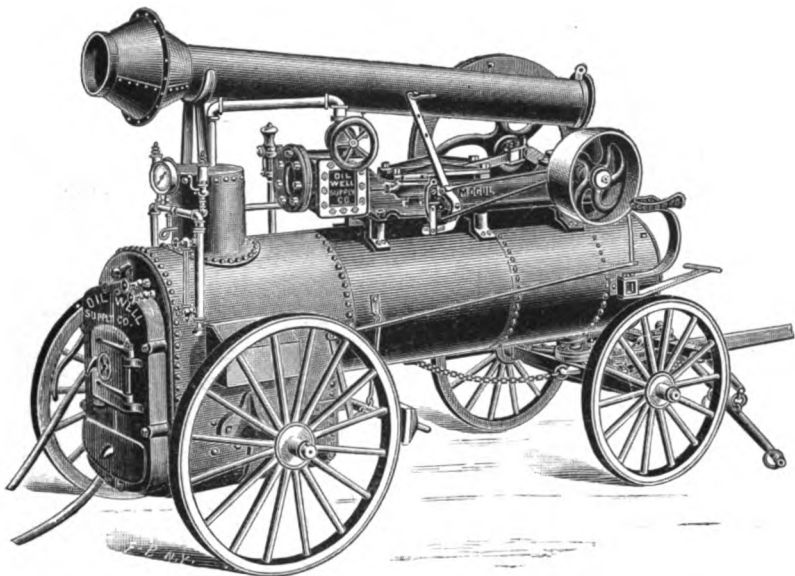
FOR PIPE MACHINES, OR SMALL POWER.

Horse Power,	-	-	-	2	-	-	4	-	-	-	6
HEIGHT, Inches,	-	-		48	-	-	56	-	-		78
FLOOR SPACE, Inches,			-	25x25		-	30x30		-	-	48x48
WEIGHT, Pounds,	-	-		720	-		1400	-	-		2300

MACHINERY.

DRILLING BOILER AND ENGINE MOUNTED ON WHEELS.

FIGURE 104.—(FORMERLY 110).



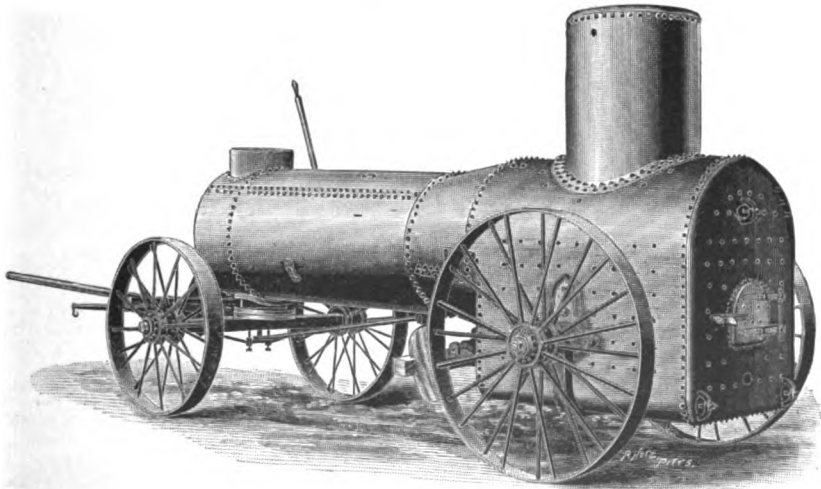
PARTICULARLY ADAPTED FOR PORTABLE RIGS. (FIGURE 16).

SPECIFICATIONS.

Number of Size.....	1	2	3	4	5
HORSE POWER, AS USUALLY RATED.....	6	8	10	12	15
Diameter of Cylinder and Length of Stroke... ..in inches	5x6	6x8	7x10	8x10	8x12
Usual number of Revolutions.....	230	220	175	175	150
Diameter of Boiler..... ..in inches	26	28	30	32	32
Length of Furnace, inside..... .."	34	36	38	38	44
Width of Furnace, inside..... .."	21	22	24	26	26
Height of Furnace..... .."	29	33	35	35	35
Number of Tubes (all 3-inch)..... ..	17	20	22	26	26
Length of Tubes .. ..in inches	60	72	78	78	78
Diameter of Stack"	12	14	14	16	16
Length of Stack..... ..in feet	18	20	20	20	20
Weight complete, on skids..... ..about	4200	5000	6100	6500	7400
Weight complete, mounted on wheels..... ..about	4300	5100	6200	6600	7600

DRILLING BOILER MOUNTED ON WHEELS.

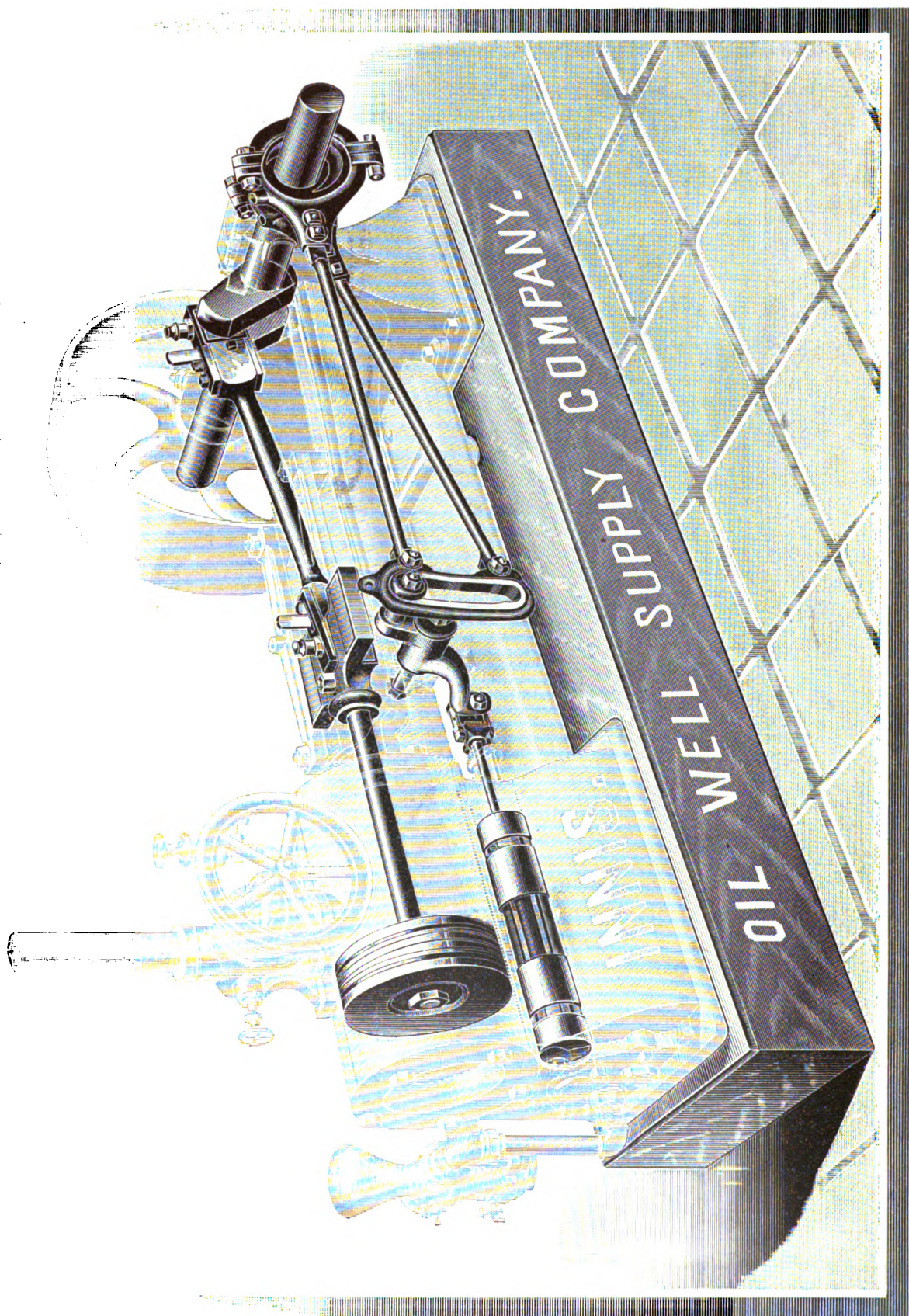
FIGURE 104 A.



For transportation over bad roads, or where there are no adequate facilities for hauling heavy machinery. Sizes, 20 and 25 horse power.

MACHINERY.

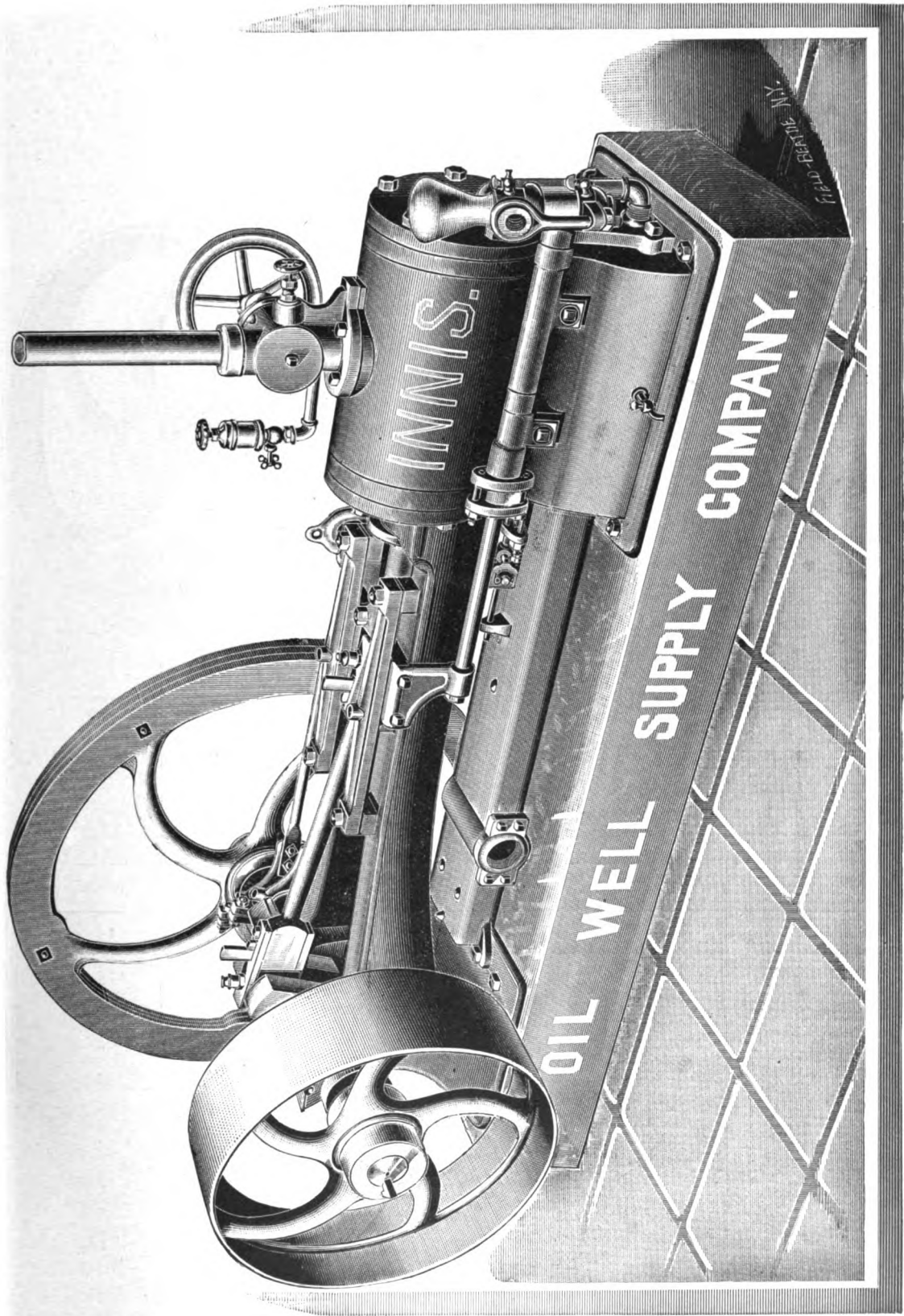
INNIS DRILLING ENGINE, BALANCED VALVE, (PHANTOM VIEW). FIGURE, 105.



MADE ONLY IN ONE SIZE, VIZ: CYLINDER 9x12 INCHES. 15 HORSE POWER.

MACHINERY.

REAR VIEW OF INNIS ENGINE. FIGURE 105 A.

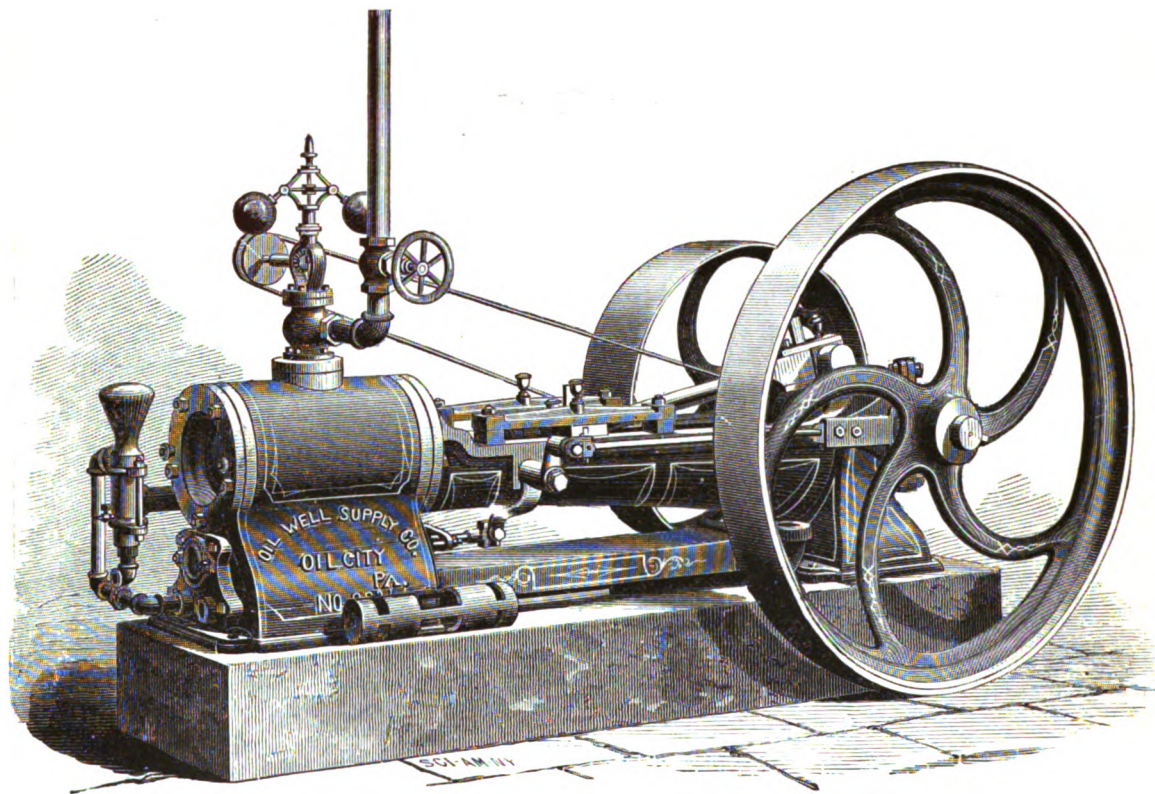


SHOWING WATER PUMP AND HEATER

MACHINERY.

INNIS STATIONARY ENGINE.

FIGURE 105 B.



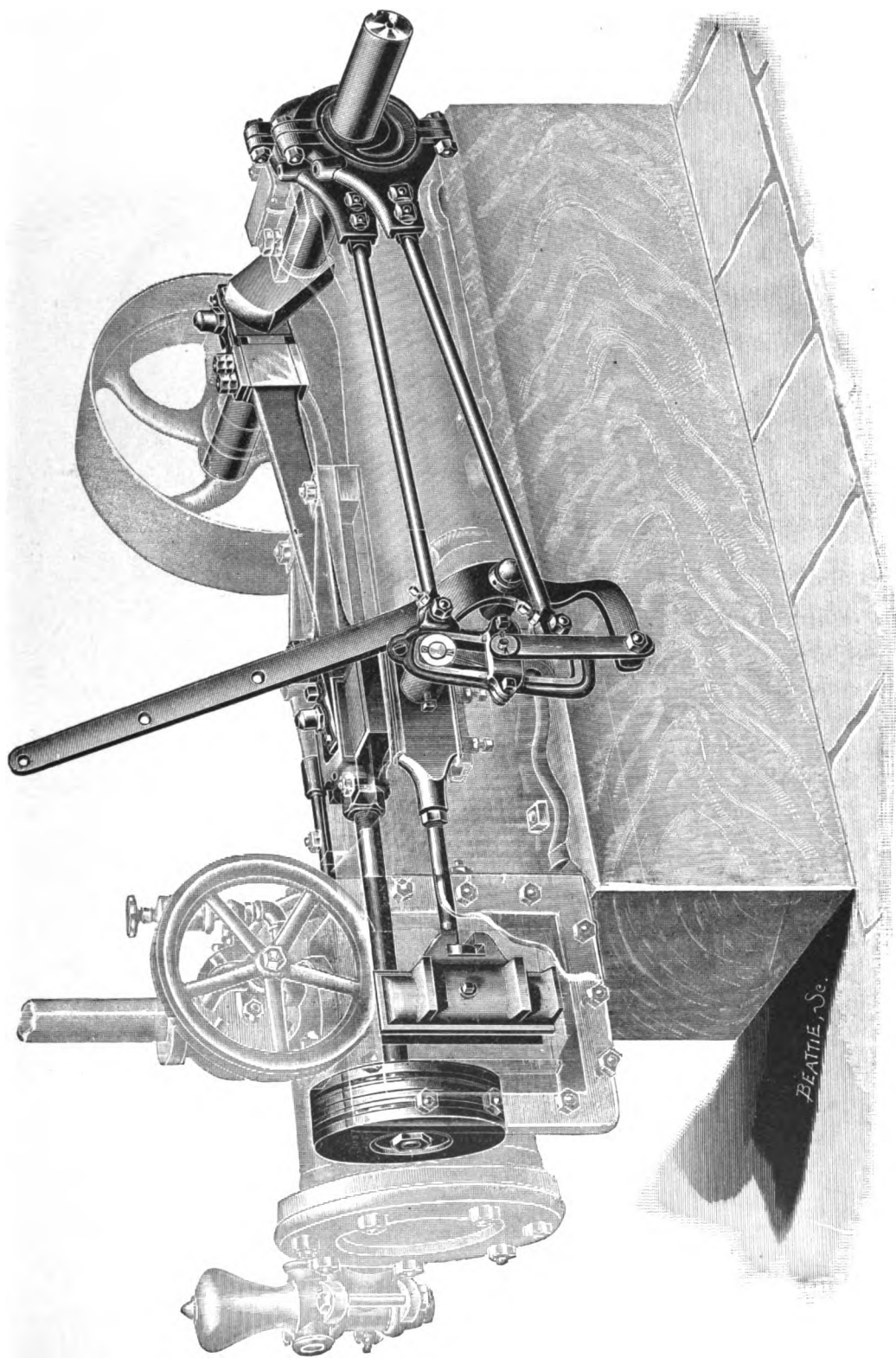
DIMENSIONS OF ENGINES.

LENGTH OF STROKE, 12 INCHES.

					MOGUL.					INNIS.	INNIS DUPLEX.
Horse Power,	-	-	-	12	15	20	25	30		15	30
Revolutions per minute,	-	-		175	175	150	150	150		175	200
Diameter of Cylinder,	-		inches,	8	9	10	11	12		9	7
" " Steam Pipe,	-		"	1½	1½	2	2	2½		2	2
" " Exhaust Pipe,	-		"	3	3	4	4	4		3	3
" " Pulley,	-	-	"	30	30	30	30	30		32	32
" " Balance Wheel,	-	-	"	54	54	56	56	56		54	54
" " Crank Shaft,	-	-	"	3¼	3½	3½	3½	4		3½	3½
" " " Pin,	-	-	"	3½	3¾	3¾	3¾	4		3¾	3¾
" " Cross Head Pin,	-	-	"	2¼	2¼	2¼	2¼	2¾		1¼	1¼
Width of Engine Block,	-	-	"	22	22	24	24	24		24	34
Length of " " " "	-	-	"	72	72	72	72	72		90	78
Weight, complete,	-	-	pounds,	2300	2600	3000	3100	4300		2800	3500
" " " " "	-	-	(about) kilos,	1050	1180	1360	1400	1950		1270	1590

MACHINERY.

MOGUL DRILLING ENGINE, SLIDE VALVE. (FRONT VIEW).
FIGURE 106.

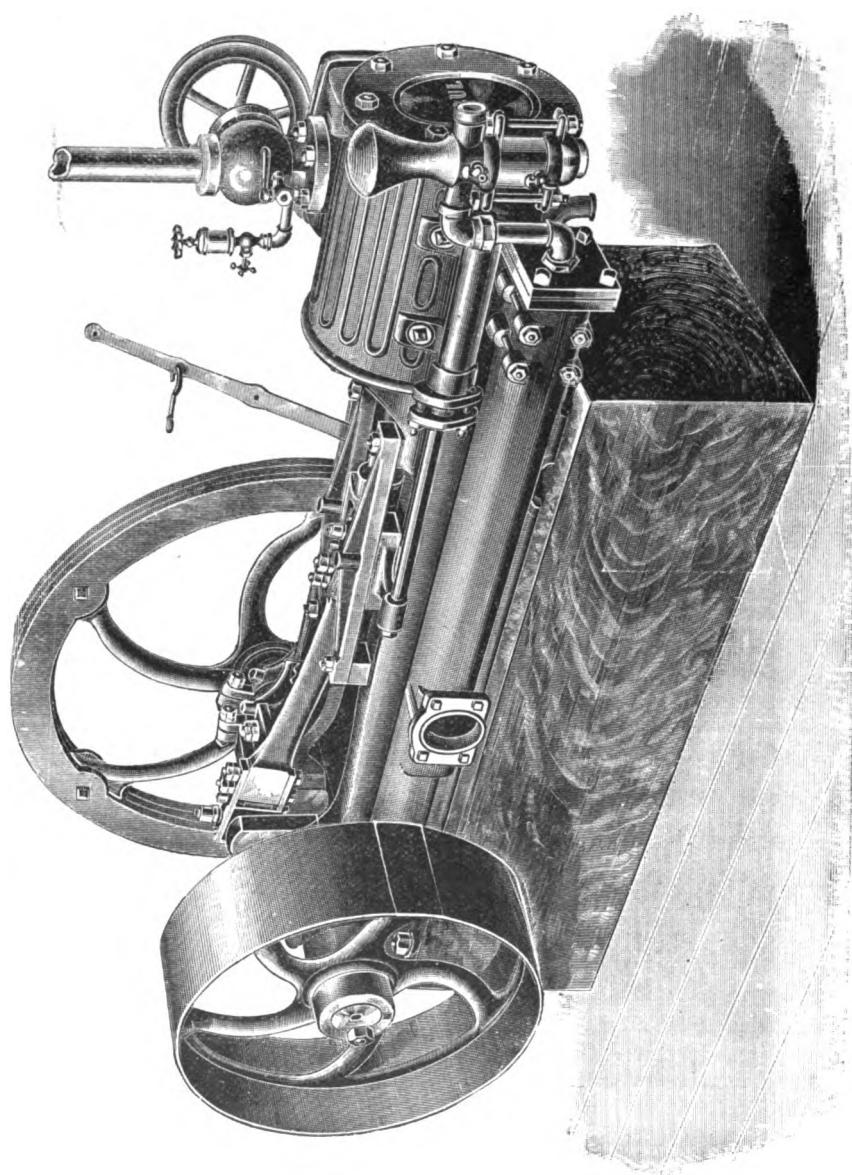


PHANTOM VIEW.

MACHINERY.

MOGUL DRILLING ENGINE. (REAR VIEW).

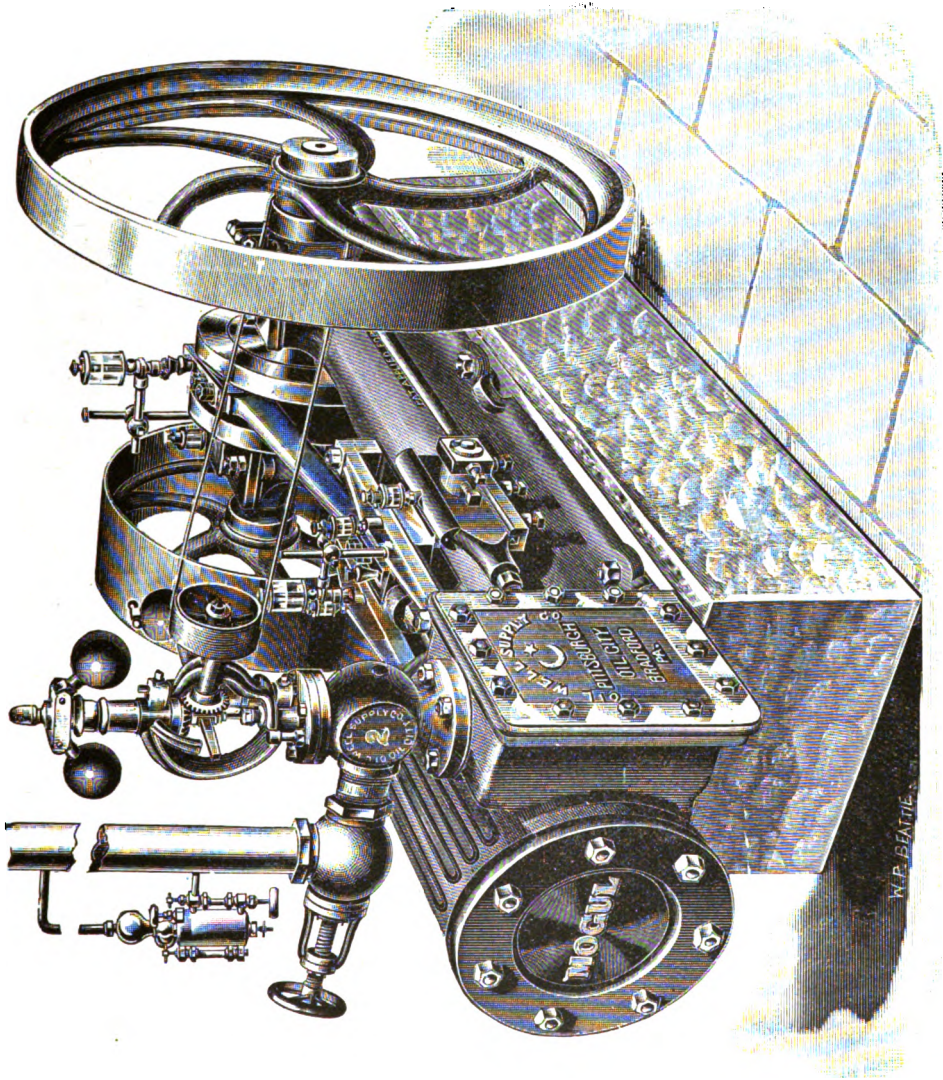
FIGURE 106 A.



SHOWING PUMP AND HEATER.

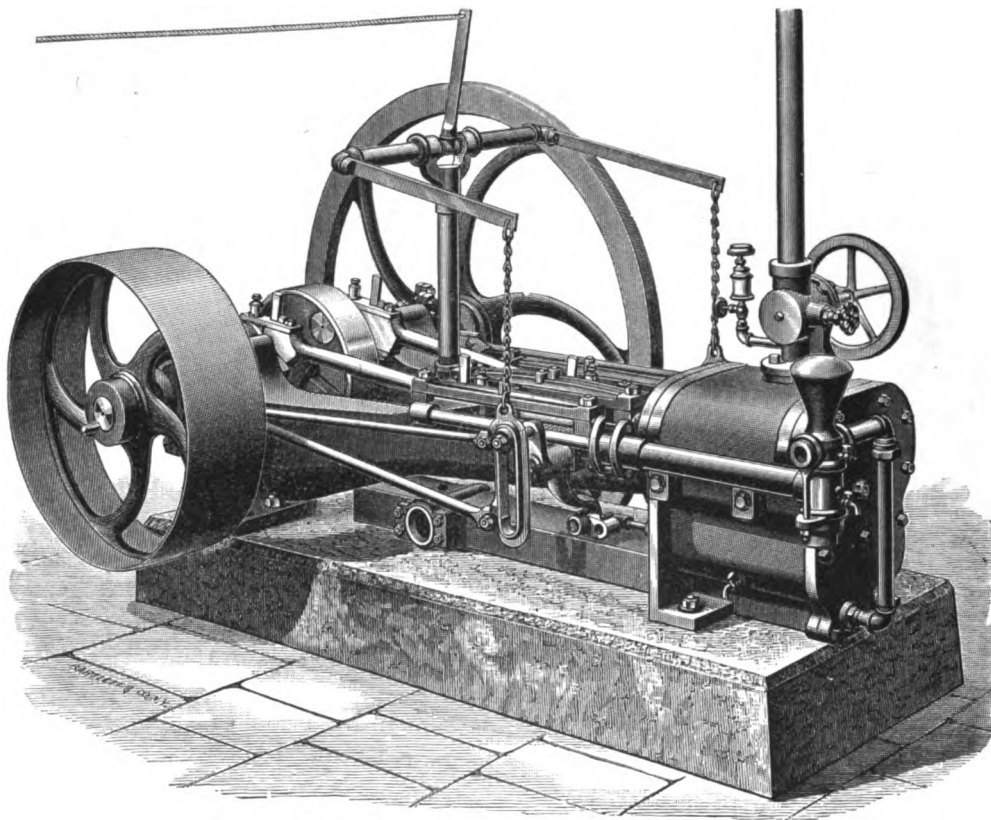
MACHINERY.

MOGUL STATIONARY ENGINE.
FIGURE 106 B.



MACHINERY.**INNIS DUPLEX DRILLING ENGINE.**

FIGURE 108.

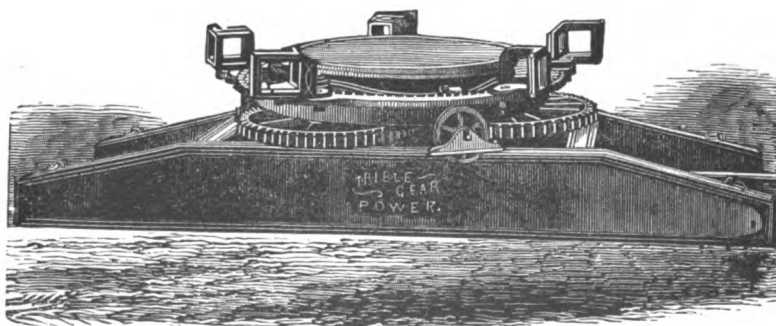


FOR DRILLING VERY DEEP WELLS.

(This Engine was used to drill the two deepest wells that have been drilled, viz., 4,500 and 4,650 feet.)

HORSE POWER.

FIGURE 113.

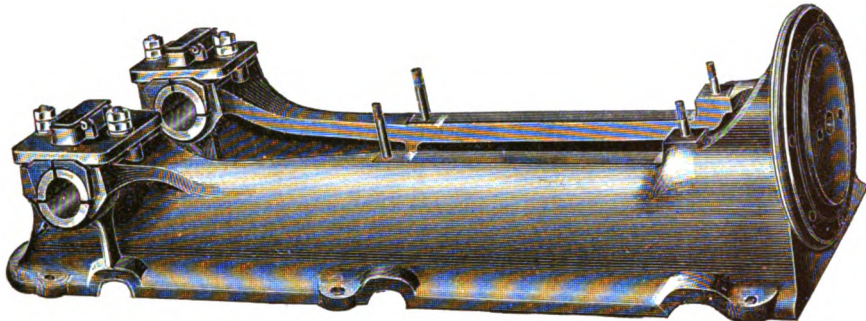


HORSE POWERS ARE MADE TO BE WORKED BY FROM 2 TO 8 HORSES.

PARTS OF MOGUL ENGINE.

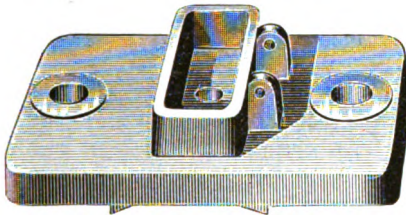
BED PLATE.

FIGURE 106-1.



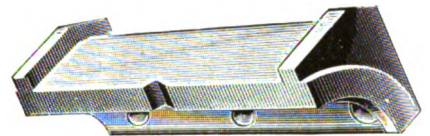
CAP.

FIGURE 106-2.



QUARTER BOX.

FIGURE 106-3.



CAP STUD.

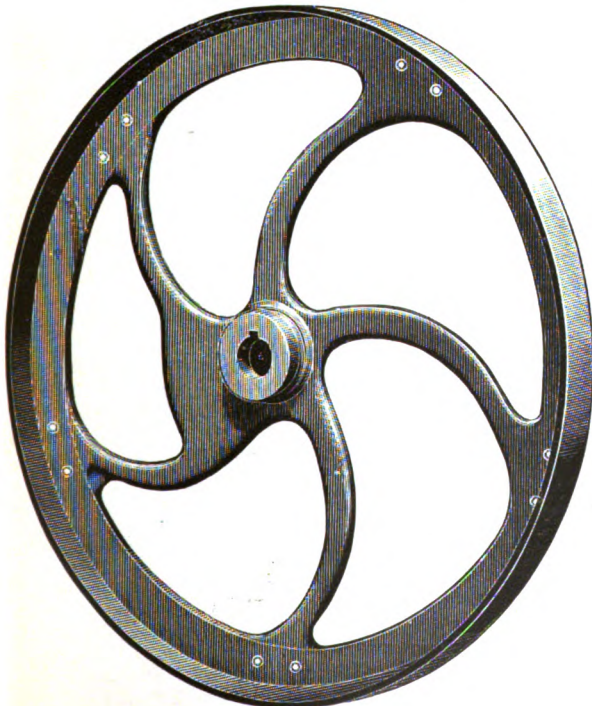
FIGURE 106-4.



BALANCE WHEEL.

CENTER FOR SOLID OR SECTIONAL BALANCES.

FIGURE 106-6.



LID FOR CAP.

FIGURE 106-5.



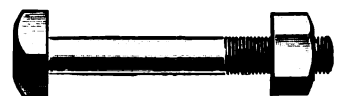
SECTIONAL BALANCE.

FIGURE 106-7.



BOLT FOR BALANCES.

FIGURE 106-8.



BALANCE WHEEL KEY.

(PATENTED).

FIGURE 106-9.

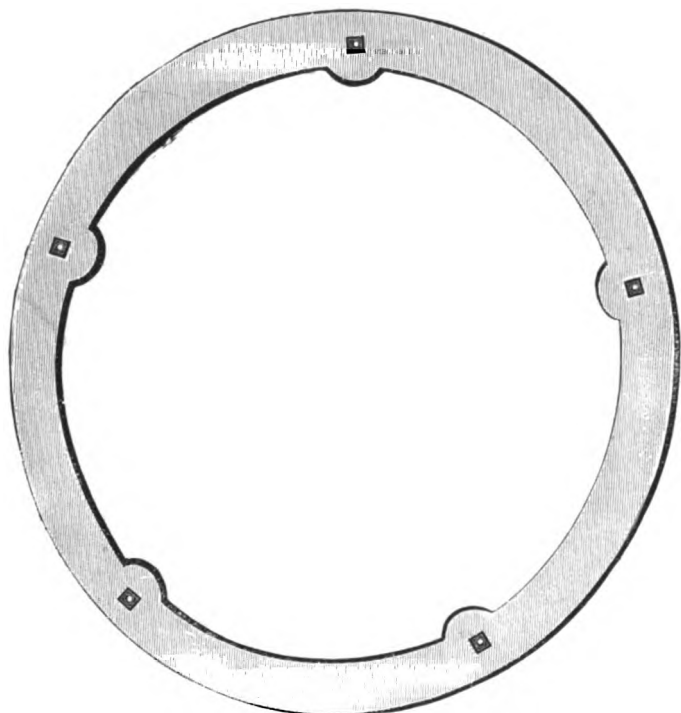


WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

PARTS OF MOGUL ENGINE.

SOLID BALANCE.

FIGURE 106-10.



BALANCE WHEEL FOR STATIONARY ENGINE.

FIGURE 106-11.



CONNECTING ROD, COMPLETE.

FIGURE 106-17.



WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

OIL CUP FOR DRILLING ENGINE.

FIGURE 106-12.



OIL CUPS FOR STATIONARY ENGINES.

PLAIN.

FIGURE 106-13.

SIGHT-FEED.

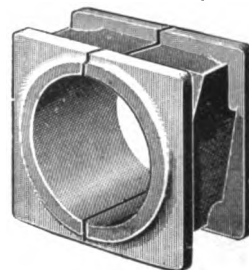
FIGURE 106-14.



CONNECTING ROD BRASSES.

CRANK END.

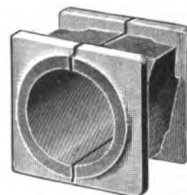
FIGURE 106-15.



CONNECTING ROD BRASSES.

CROSSHEAD END.

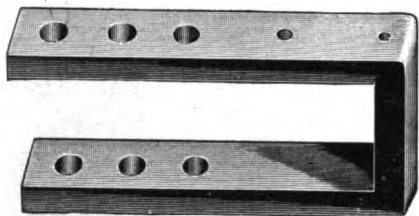
FIGURE 106-16.



PARTS OF MOGUL ENGINES.

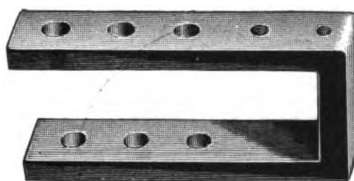
CONNECTING ROD STRAPS.

CRANK END.—FIGURE 106-18.



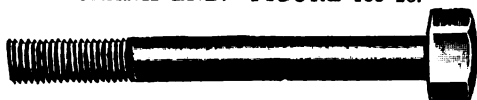
CROSSHEAD END.

FIGURE 106-19.



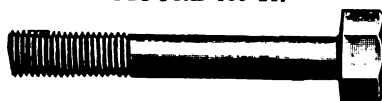
CONNECTING ROD STRAP BOLTS.

CRANK END.—FIGURE 106-20.



CROSSHEAD END.

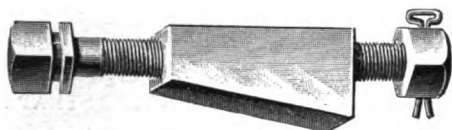
FIGURE 106-21.



CONNECTING ROD WEDGE AND BOLT.

LARGE, FOR CRANK END.
SMALL, FOR CROSSHEAD END.

FIGURE 106-22.



WEDGE BOLT SPRING.

LARGE, FOR CRANK END.
SMALL, FOR CROSSHEAD END.

FIGURE 106-23.



WEDGE BOLT SPRING CAP SCREW.

FIGURE 106-24.

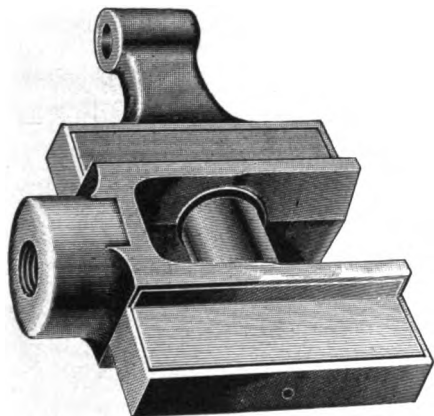


WEDGE BOLT COTTER.

FIGURE 106-25.



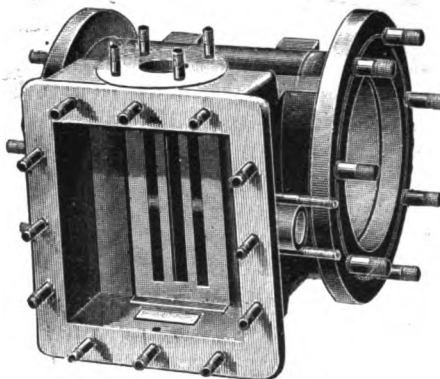
CROSSHEAD.—FIGURE 106-26.



CYLINDER HEAD.—FIGURE 106-28.

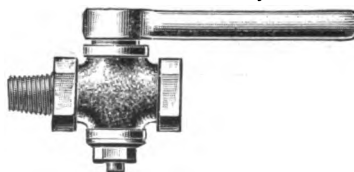
CYLINDER, WITH STUDS.

FIGURE 106-27.



CYLINDER COCK.

FIGURE 106-29.



CYLINDER STUDS, BED END.

SHORT.

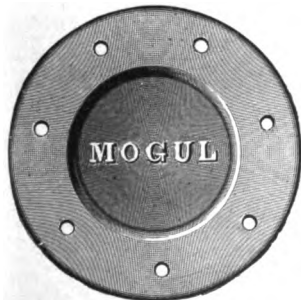
FIGURE 106-31.

LONG.

FIGURE 106-32.



CYLINDER STUD, HEAD END.—FIGURE 106-30.



WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

MOGUL ENGINE PARTS.**DOUBLE ECCENTRIC FOR
DRILLING ENGINE.**

FIGURE 106-33.

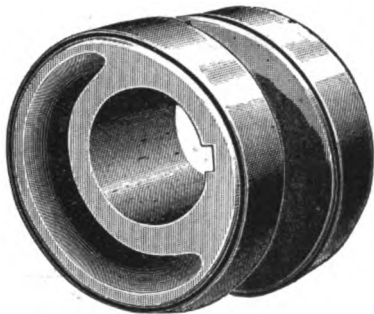
**ECCENTRIC KEY.**

FIGURE 106-35.

**ECCENTRIC STRAP, COMPLETE.**

FIGURE 106-34.

**ECCENTRIC ROD FOR DRILLING ENGINE.**

FIGURE 106-36.

**ECCENTRIC ROD FOR ROCK ARM STATIONARY ENGINE.**

FIGURE 106-37.

**ECCENTRIC STRAP BOLT.**

FIGURE 106-38.

**ECCENTRIC ROD BOLT.**

FIGURE 106-39.

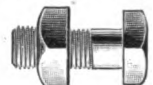
**ECCENTRIC ROD BUSHINGS.****DRILLING.**

FIGURE 106-40.

**STATIONARY.**

FIGURE 106-41.

**EXHAUST FLANGE
CAP SCREW.**

FIGURE 106-43.

**EXHAUST FLANGE.**

FIGURE 106-42.

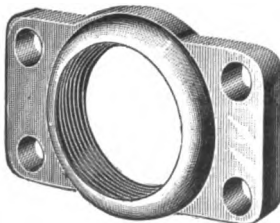
**BED PLATE BOLT AND NUTS.**

FIGURE 106-44.

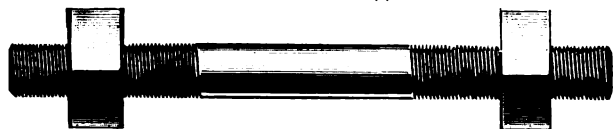
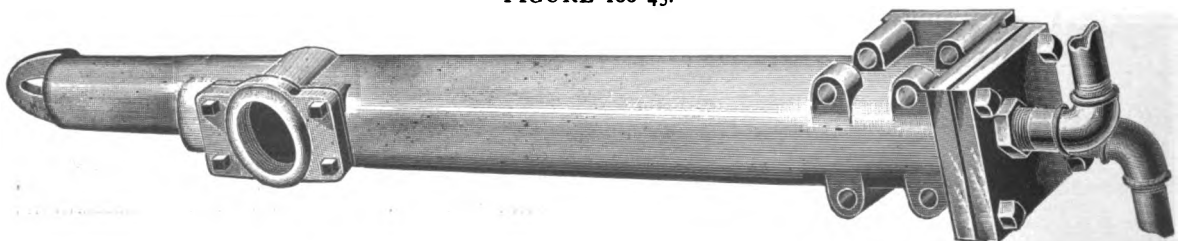
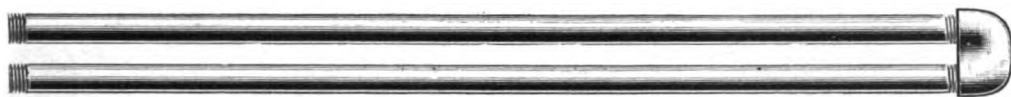
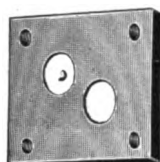
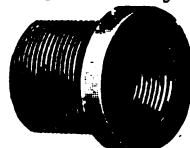
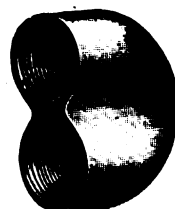
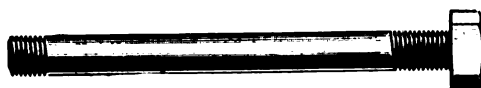
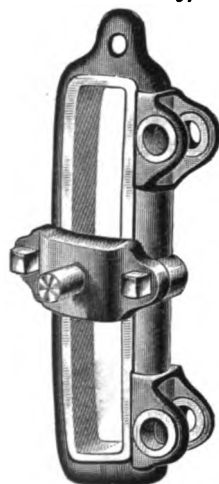
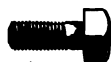
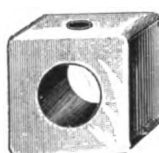
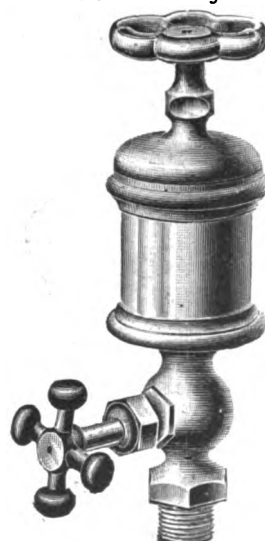
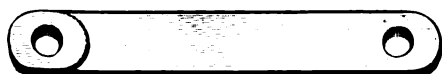
**HEATER, COMPLETE.**

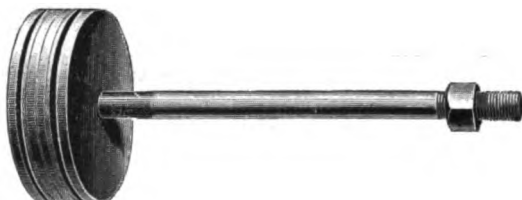
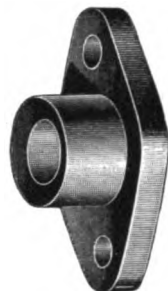
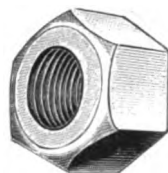
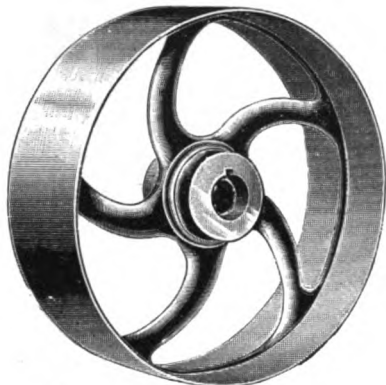
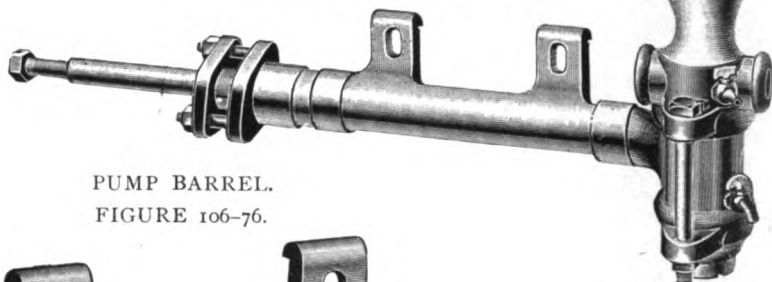
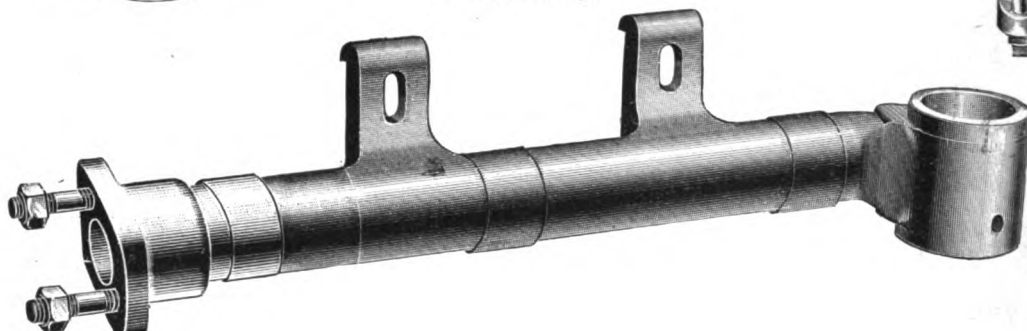
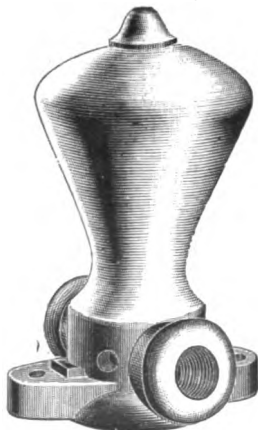
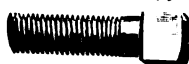
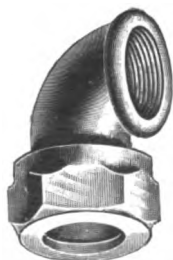
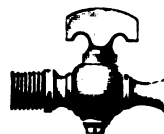
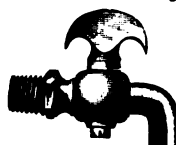
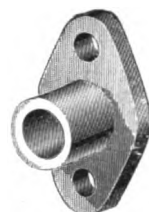
FIGURE 106-45.



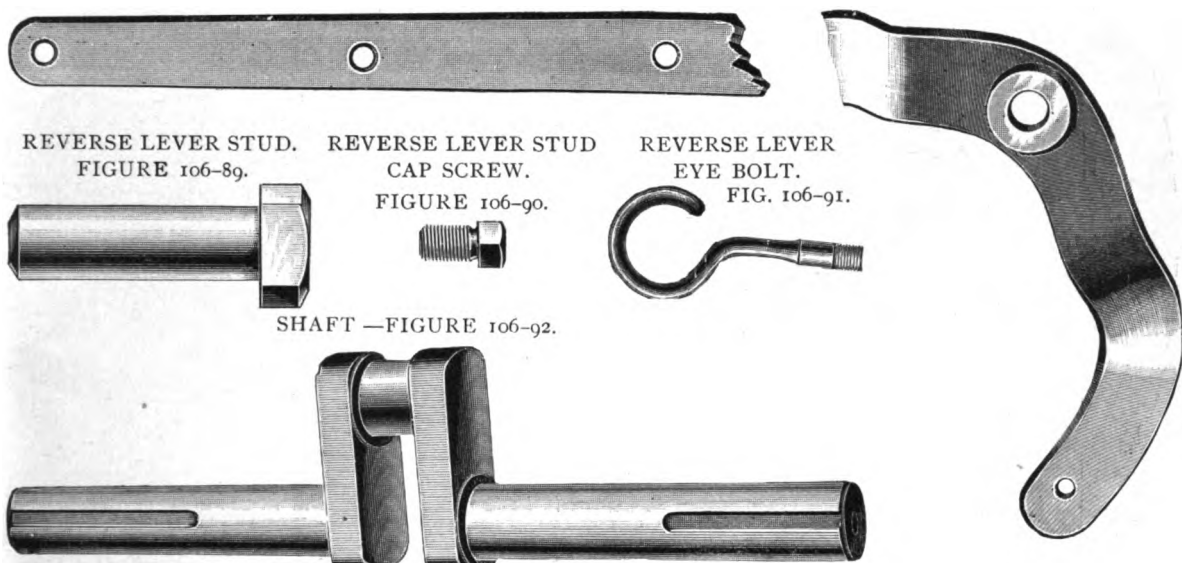
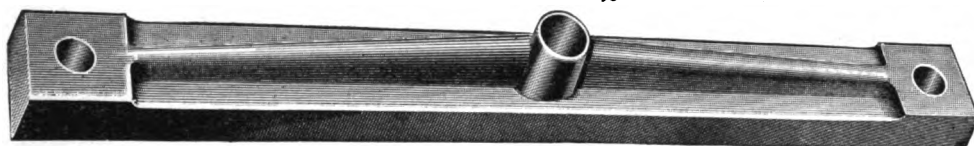
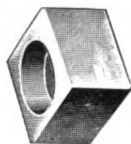
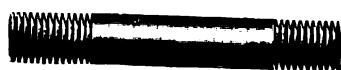
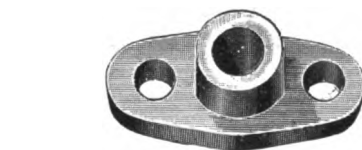
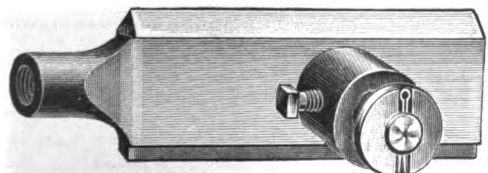
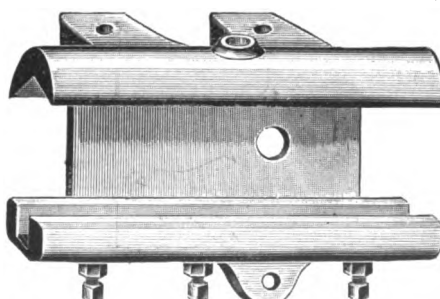
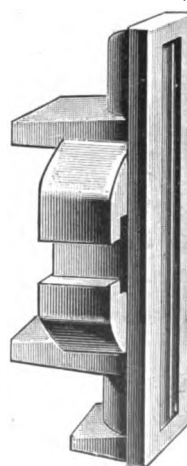
WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

MOGUL ENGINE PARTS.**HEATER PIPES.****FIGURE 106-46.****HEATER BOLT.****FIGURE 106-47.****HEATER HEAD.****FIGURE 106-48.****HEATER HEAD
CAP SCREW.****FIGURE 106-49.****HEATER COLLAR****FIGURE 106-50.****HEATER ELBOW.****FIGURE 106-51.****HEATER LOCK NUT.****FIGURE 106-52.****HEATER NIPPLE.****FIGURE 106-53.****HEATER RETURN BEND.****FIGURE 106-54.****HEATER UNION NIPPLE.****FIGURE 106-55.****HEATER STUD.****FIGURE 106-56.****LINK, COMPLETE.****FIGURE 106-57.****LINK EAR BOLT.****FIGURE 106-58.****LINK SADDLE.****FIGURE 106-60.****LINK SADDLE CAP SCREW.****FIGURE 106-62.****LINK HANGER BOLT
AND NUT.****FIGURE 106-59.****LINK BLOCK.****FIGURE 106-61.****LINK SADDLE COTTER.****FIGURE 106-63.****LUBRICATOR.****FIGURE 106-65.****LUBRICATOR ELBOW.****FIGURE 106-67.****LINK HANGER.****FIGURE 106-64.****LUBRICATOR NIPPLE.****FIGURE 106-66.**

WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

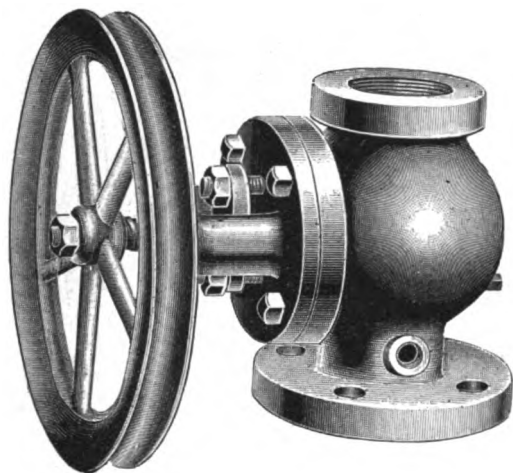
MOGUL ENGINE PARTS.**PISTON RING.****FIGURE 106-68.****PISTON, COMPLETE WITH ROD.****FIGURE 106-69.****PISTON GLAND.—FIGURE 106-70.****PISTON NUT.****FIG. 106-71.****PULLEY.—FIGURE 106-72.****PULLEY KEY AND NUT.****FIGURE 106-73.****PISTON GLAND STUD AND NUT.****FIGURE 106-74.****PUMP, COMPLETE.—FIGURE 106-75.****PUMP BARREL.****FIGURE 106-76.****PUMP AIR CHAMBER.****FIGURE 106-77.****PUMP BASE.****FIGURE 106-85.****PUMP CONNECTING BOLT AND NUT.****FIGURE 106-78.****PUMP BARREL CAPSCREW****FIGURE 106-79.****PUMP UNION ELBOW.****FIGURE 106-82.****AIR COCK.****FIGURE 106-80.****BIB NOZZLE AIR COCK****FIGURE 106-83.****PUMP GLAND STUD AND NUT.****FIGURE 106-86.****PUMP PLUNGER AND NUT.****FIGURE 106-87.****PUMP GLAND.****FIGURE 106-81.****PUMP VALVE AND SEAT.****FIGURE 106-84.**

WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

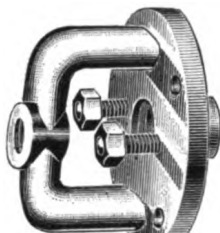
MOGUL ENGINE PARTS.**REVERSE LEVER.—FIGURE 106-88.****SHAFT —FIGURE 106-92.****GUIDE.—FIGURE 106-93.****STEAM CHEST COVER.**
FIGURE 106-94.**GUIDE BLOCK.—FIGURE 106-95.****GUIDE STUD, LONG.**
FIGURE 106-97.**GUIDE STUD, SHORT.**
FIGURE 106-96.**VALVE ROD GLAND STUD**
AND NUT.
FIGURE 106-98.**STEAM CHEST COVER STUD AND NUT.** **VALVE ROD GLAND.—FIGURE 106-100.****VALVE ROD.—FIGURE 106-101.****VALVE ROD HEAD, COMPLETE, WITH**
LINK PIN.—FIGURE 106-102.**VALVE ROD GUIDE.—FIGURE 106-103.****SLIDE VALVE.**
FIGURE 106-104.**WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.**

MOGUL ENGINE PARTS.

THROTTLE VALVE, COMPLETE.
FIGURE 106-105.



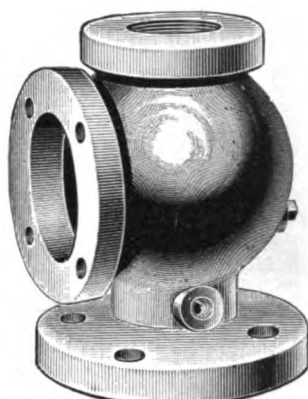
VALVE YOKE.
FIGURE 106-106.



**VALVE YOKE
CAP SCREW.**
FIGURE 106-103.



VALVE BODY.
FIGURE 106-107.



VALVE CLAPPER.
FIG. 106-111.



VALVE SEAT.
FIG. 106-112.



VALVE STEM.
FIGURE 106-109.



THROTTLE VALVE WHEEL.
FIGURE 106-113.



VALVE NUT.
FIG. 106-110.

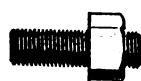


VALVE STEM GLAND.—FIGURE 106-114.

**VALVE AND STEAM
CHEST STUD.**
FIGURE 106-115



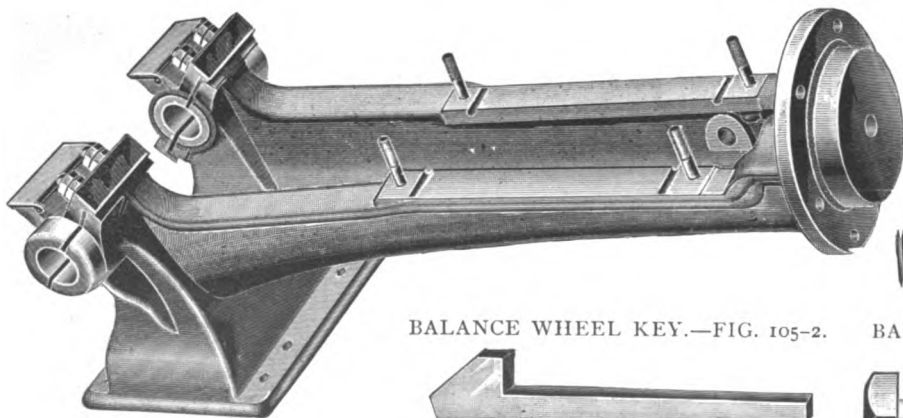
**VALVE STEM
GLAND STUD
AND NUT.**
FIGURE 106-116.



MALLEABLE IRON WRENCH.—FIGURE 106-117.

**INNIS ENGINE PARTS.**

BED PLATE COMPLETE WITH CAPS AND STUDS.—FIGURE 105-1.



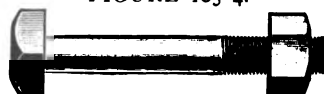
CAP STUD.
FIGURE 105-3.



BALANCE WHEEL KEY.—FIG. 105-2.



BALANCE WHEEL BOLT.
FIGURE 105-4.

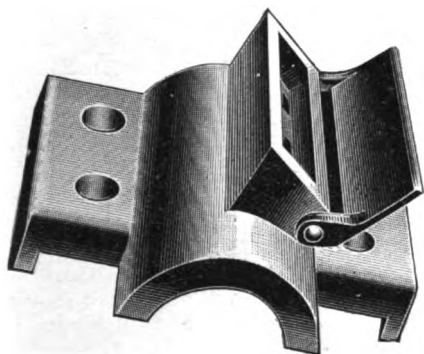


WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

INNIS ENGINE PARTS.

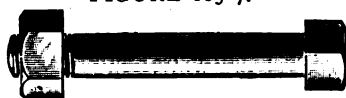
FOR BALANCE WHEELS, SEE MOGUL ENGINE PARTS.

BOX COVER.—FIGURE 105-5.



CONNECTING ROD BOLT.

FIGURE 105-7.



CONNECTING ROD

SET SCREW.

FIGURE 105-8.



OIL CUPS.

DRILLING.
FIGURE 105-9.



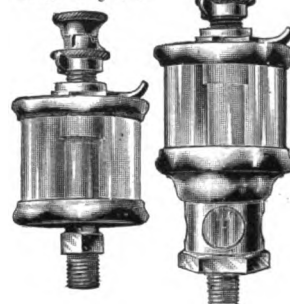
STATIONARY.

SIGHT FEED.

FIG. 105-11.

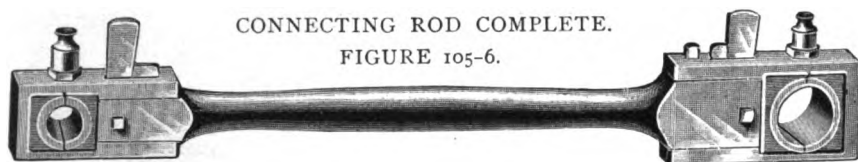
PLAIN.

FIG. 105-10.

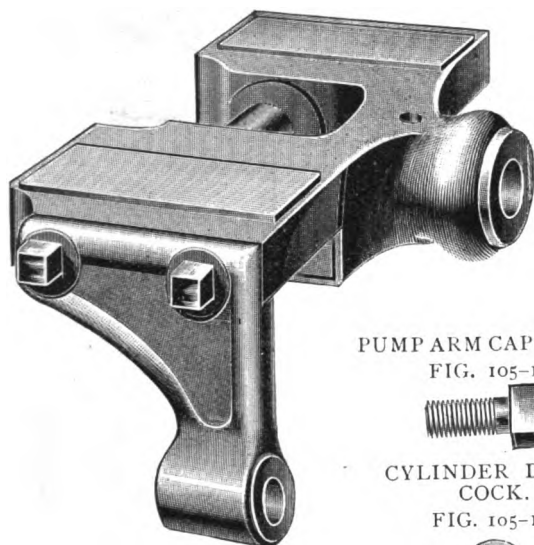


CONNECTING ROD COMPLETE.

FIGURE 105-6.



CROSS-HEAD COMPLETE.—FIGURE 105-12.



CYLINDER COMPLETE,
WITH STUDS AND NUTS.—FIGURE 105-13.



PUMP ARM CAP SCREW.

FIG. 105-14.



CYLINDER DRAIN
COCK.

FIG. 105-15.



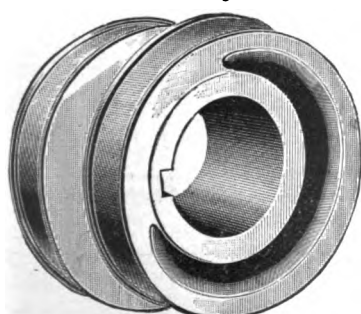
CROSS-HEAD PIN.

FIGURE 105-16.



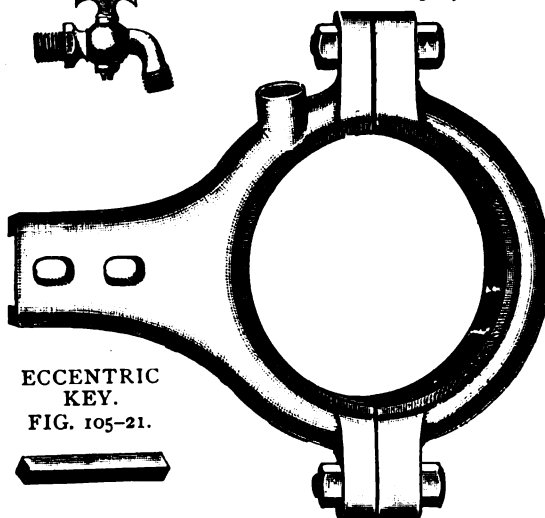
DOUBLE ECCENTRIC.

FIGURE 105-20.



ECCENTRIC STRAP.

FIGURE 105-17.



CYLINDER

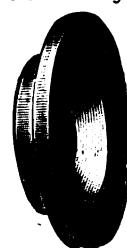
CAP SCREW.

FIGURE 105-18.



CYLINDER HEAD.

FIGURE 105-19.



ECCENTRIC
KEY.

FIG. 105-21.



WHEN ORDERING PARTS, STATE SIZE AND NUMBER OF ENGINE.

INNIS ENGINE PARTS.

ECCENTRIC ROD FOR DRILLING ENGINE.
FIGURE 105-22.



ECCENTRIC ROD FOR STATIONARY ENGINES.
FIGURE 105-23.



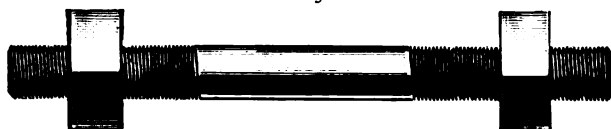
ECCENTRIC STRAP BOLT.
FIGURE 105-24.



ECCENTRIC ROD BOLT.
FIGURE 105-25.



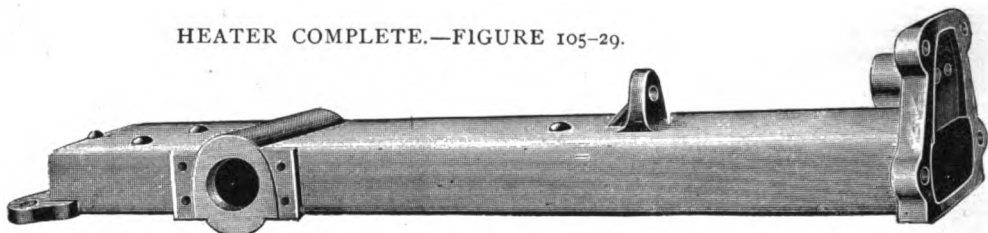
BED PLATE BOLT AND NUTS.
FIGURE 105-28.



ECCENTRIC ROD BUSHINGS.
STATIONARY. FIG. 105-26.
DRILLING. FIG. 105-27.



HEATER COMPLETE.—FIGURE 105-29.

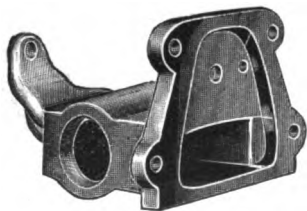


HEATER PIPES.—FIGURE 105-30.



FOR HEATER PARTS, SEE MOGUL ENGINE PARTS.

EXHAUST HEAD.
FIGURE 105-31.

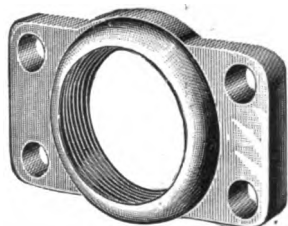


CAP SCREW FOR HEATER,
EXHAUST HEAD AND EXHAUST
FLANGE.

FIGURE 105-32.

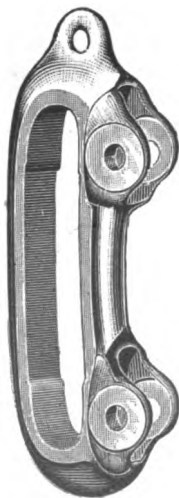


EXHAUST FLANGE.
FIGURE 105-33.



LINK.

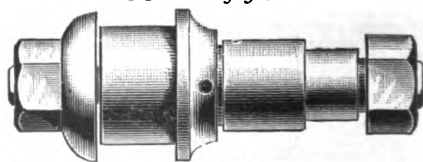
FIGURE 105-34.



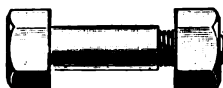
FOR LUBRICATOR PARTS, SEE MOGUL ENGINE PARTS.

LINK STUD WITH ROLLER AND
WASHER.

FIGURE 105-36.



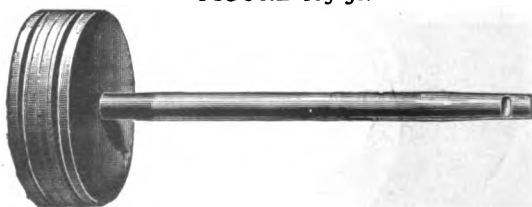
LINK EAR BOLT.
FIGURE 105-35.



LINK ROLLER.
FIGURE 105-37.



PISTON COMPLETE, WITH ROD.
FIGURE 105-38.



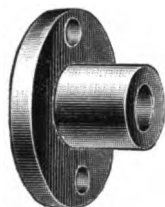
WHEN ORDERING PARTS, GIVE SIZE AND NUMBER OF ENGINE.

INNIS ENGINE PARTS.

PISTON RING.
FIGURE 105-39.



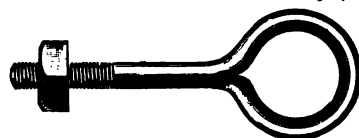
PISTON GLAND.
FIGURE 105-40.



PISTON GLAND STUD
FIGURE 105-41.



PUMP EYE BOLT.—FIG. 105-42.



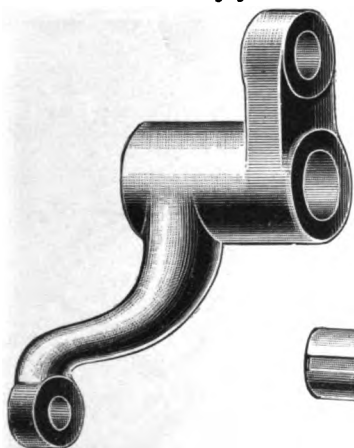
PULLEY.
FIGURE 105-45.



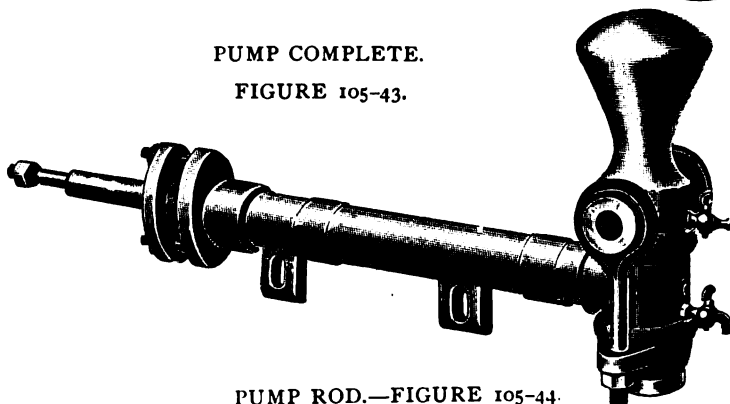
PULLEY KEY.
FIGURE 105-46.



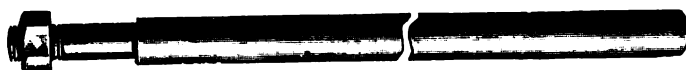
ROCKER ARM.
FIGURE 105-50.



PUMP COMPLETE.
FIGURE 105-43.



PUMP ROD.—FIGURE 105-44.



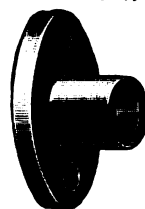
PUMP BARREL CAP
SCREW.—FIG. 105-47.



PUMP ROD GLAND
STUD —FIG. 105-48.



PUMP ROD GLAND.
FIGURE 105-49.



PUMP VALVE
FIG. 105-51.



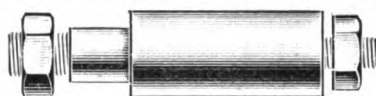
PUMP VALVE
SEAT.
FIG. 105-52.



PUMP BARREL,
AIR CHAMBER,
AND BASE, NOT
ILLUSTRATED.

FOR PUMP CONNECTIONS SEE
MOGUL ENGINE PARTS.

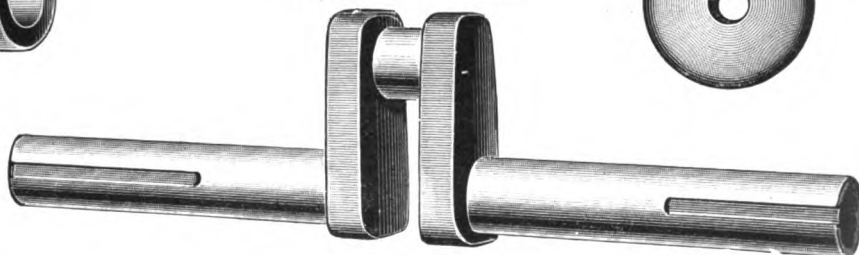
ROCKER ARM STUD.—FIGURE 105-53.



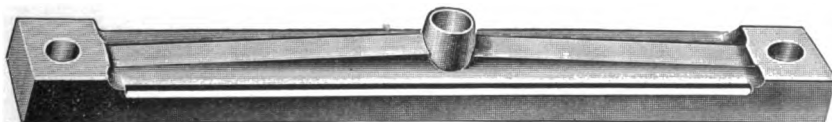
ROCKER ARM WASHER
FIGURE 105-54.



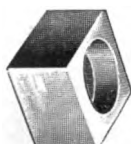
SHAFT.—FIGURE 105-55.



GUIDE.—FIGURE 105-56.



GUIDE BLOCK.—FIG. 105-57.



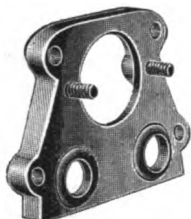
GUIDE STUD.
FIGURE 105-58.



WHEN ORDERING PARTS, GIVE SIZE AND NUMBER OF ENGINE.

INNIS ENGINE PARTS.

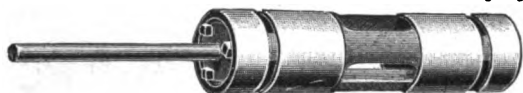
STEAM CHEST COVER.
FIGURE 105-59.



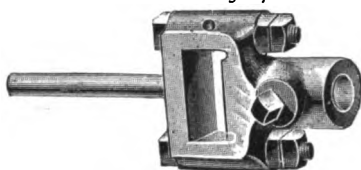
**STEAM CHEST COVER
CAP SCREW.**
FIGURE 105-60.



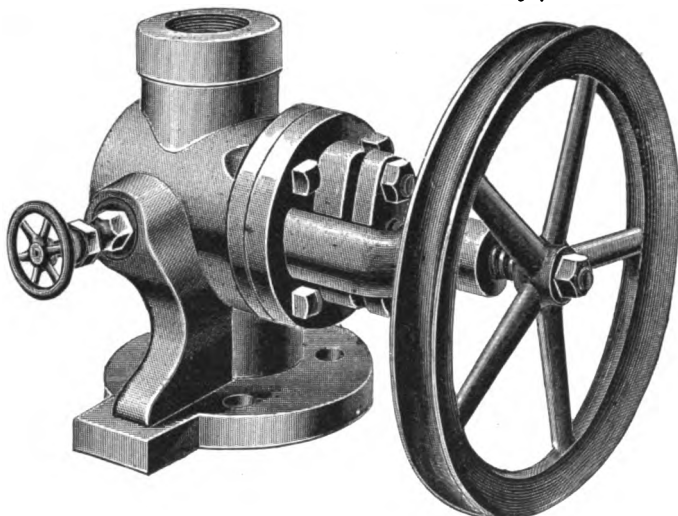
VALVE AND ROD COMPLETE.—FIGURE 105-65.



VALVE YOKE AND GUIDE STEM COMPLETE.
FIGURE 105-67.



THROTTLE VALVE.—FIGURE 105-70.



VALVE STEM.—FIGURE 105-75.



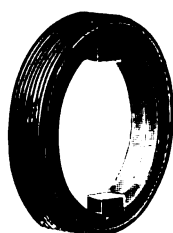
VALVE NUT.—FIGURE 105-76



VALVE CLAPPER.
FIGURE 105-78.



VALVE SEAT.
FIGURE 105-79.



VALVE BORE COVER.
FIGURE 105-61.



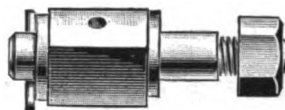
VALVE ROD CAP SCREW.
FIGURE 105-63.



**VALVE ROD GLAND
STUD.**
FIGURE 105-66



**VALVE YOKE BLOCK AND
STUD COMPLETE.**
FIGURE 105-68.



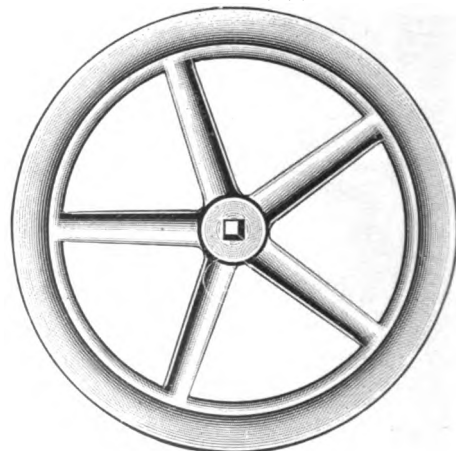
**THROTTLE
VALVE YOKE
CAP SCREW.**
FIGURE 105-71.



**THROTTLE
VALVE
CAP SCREW.**
FIGURE 105-72.



THROTTLE VALVE WHEEL.
FIGURE 105-74.



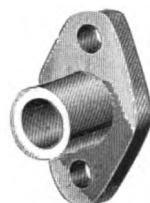
MALLEABLE IRON WRENCH.—FIGURE 105-80.



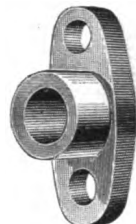
**VALVE BORE
COVER STUD.**
FIGURE 105-62.



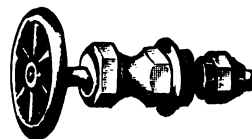
VALVE ROD GLAND.
FIGURE 105-64.



**THROTTLE VALVE
GLAND.**
FIGURE 105-69.



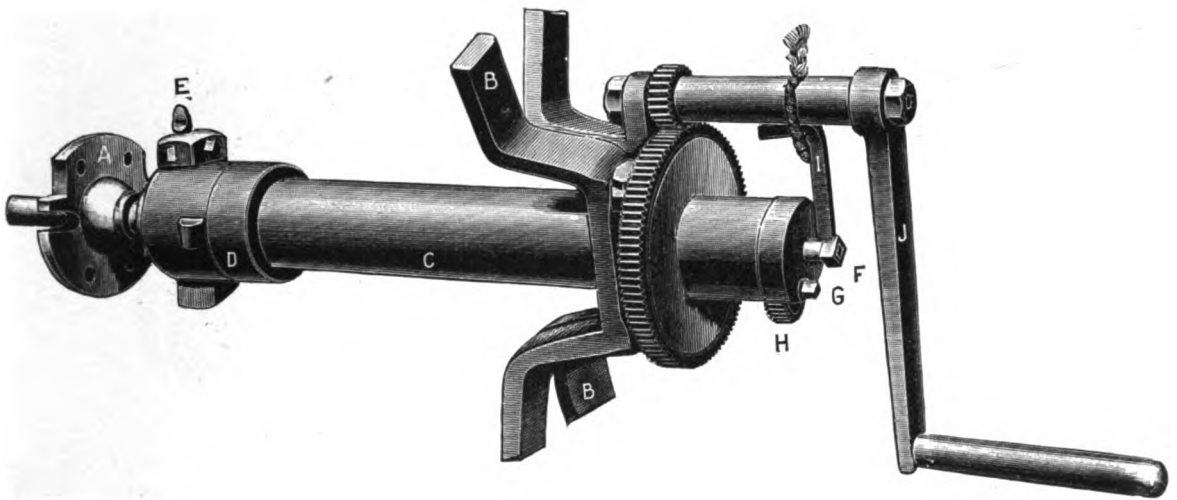
**DRAIN VALVE
FOR THROTTLE.**
FIGURE 105-73.



WHEN ORDERING PARTS, GIVE SIZE AND NUMBER OF ENGINE.

CARRUTHERS' CYLINDER BORING BAR.

FIGURE 109.



A, self-centering cone for the stuffing-box end of the cylinder, with sleeve journal ; B, yoke or spider, for face of cylinder ; C, bar ; D, travelling head ; E, cutting tool ; F, center gear for feed screw ; H, gear ; meshing into center gear F ; J, handle.

The crank, now on F, is placed on G, and the travelling head D, is drawn out the length of the cylinder. The cylinder head, piston and piston-rod are removed, and the cone A, centered in the piston-rod hole. The cutting tool, E, is adjusted. The screw, G, is turned until the spider, B, bears against the cylinder.

The crank is changed from G to F, and fastened to the shaft of the handle, J, as shown. Turning of the handle, J, gives the proper motion and feed to the tool E.

This device is especially adapted for boring out the cylinders of oil engines while on their blocks at the wells, for which purpose it has proved economical and effective.

DRILLERS' TOOLS.

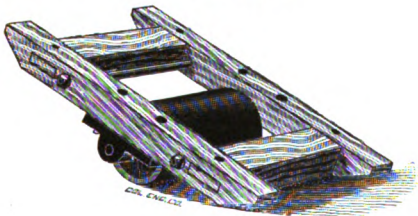
TRUCK.

FIGURE 109 A.



To move Bits and other heavy Tools.

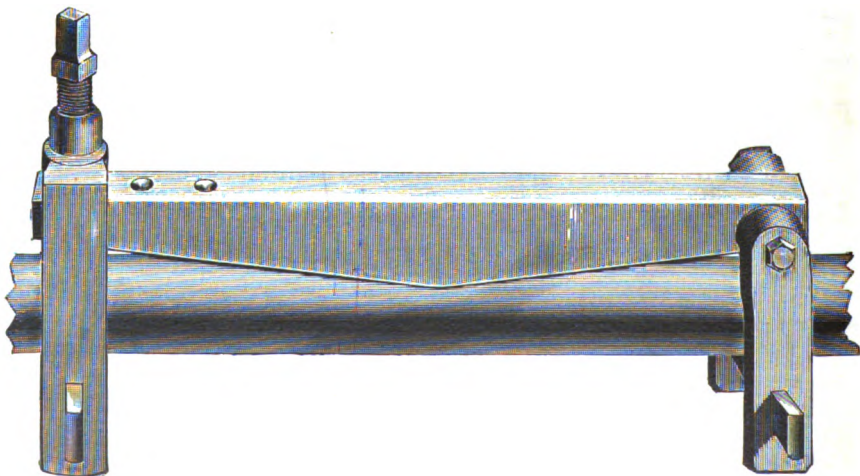
DOLLIE.
FIGURE 109 B.



For moving Stems, Pipe, &c.

STEM STRAIGHTENER.

FIGURE 109 C.



To straighten Auger Stems or Sinker Bars. Can be applied when lying on the Ground or Standing in the Derrick.

DRILLING TOOLS.

TEMPER SCREWS.

WITH EYE.

FIGURE 116.



These Temper Screws have
the Mack Patent Link Seat
and the Mason Patent Ball
Washer.

WITH TEE. (KNOX'S PATENT).

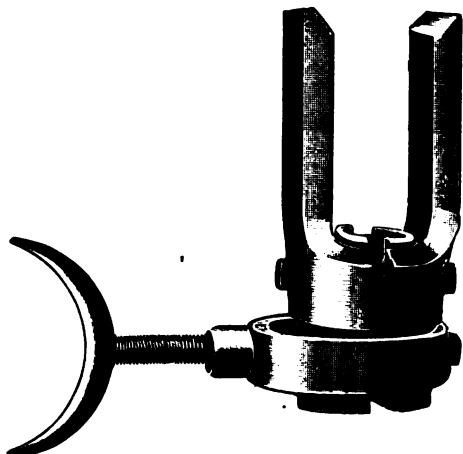
FIGURE 116 A.



DRILLING TOOLS.**TEMPER SCREW PARTS.**

LOWER PART OF REINS
WITH PATENT REMOVABLE BOX.

FIGURE 116 B.



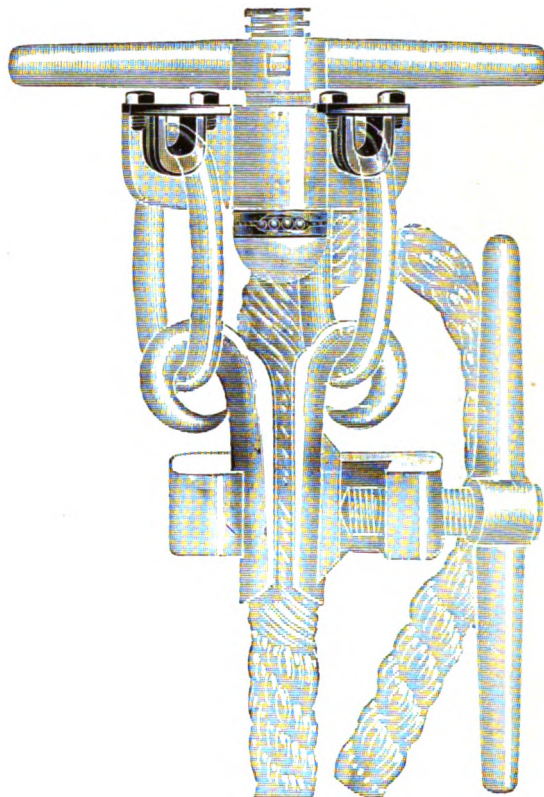
DETAIL OF FIGURE 116 B.

FIGURE 116 C.



SWIVEL WITH MACK'S PATENT LINK SEATS,
AND MASON'S PATENT BALL WASHER.

FIGURE 116 D.



MASON'S PATENT
BALL WASHER.

FIGURE 116 F.



MACK'S PATENT
LINK SEAT.

FIGURE 116 E.

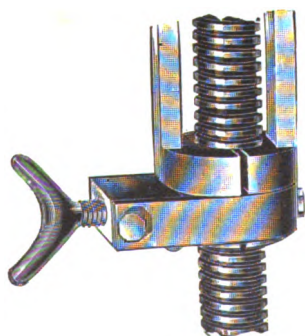


This Washer having less friction than
the common washer makes the swivel
very easy to turn.

SUTLEY'S PATENT QUICK OPENING YOKE.

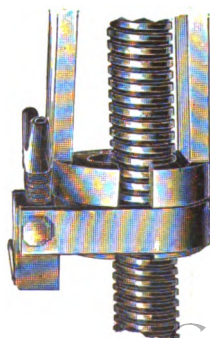
YOKE CLOSED.

FIGURE 116 G.



YOKE OPEN.

FIGURE 116 H.



DRILLING TOOLS.

SINKER BAR.

FIGURE 117.



AUGER STEM.

FIGURE 118.

6 to 45 feet long.

$2\frac{1}{2}$ to 5 inches in diameter.



JARS.

FIGURE 119.



DRILLING TOOLS.

BITS FOR DRILLING.

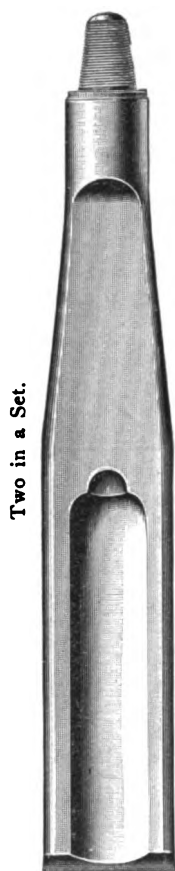
SMALL.
(UNDER $5\frac{3}{4}$ INCHES).

FIGURE 120.



LARGE.
(OVER $5\frac{3}{4}$ INCHES).

FIGURE 121.



FLAT.

FIGURE 121—A.

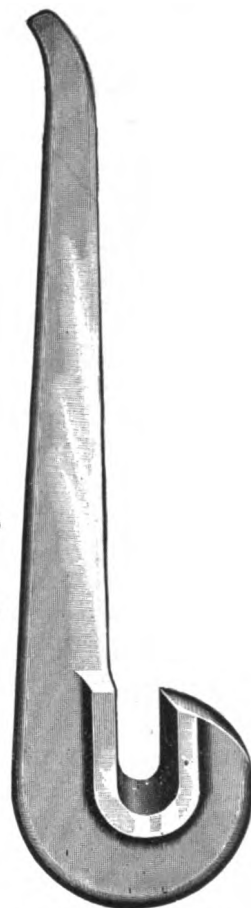


Sometimes preferred to the regular bits shown in Figures 120 and 121.

WRENCH.

FIGURE 122.

Two in a Set, one Right Hand and the other Left Hand.



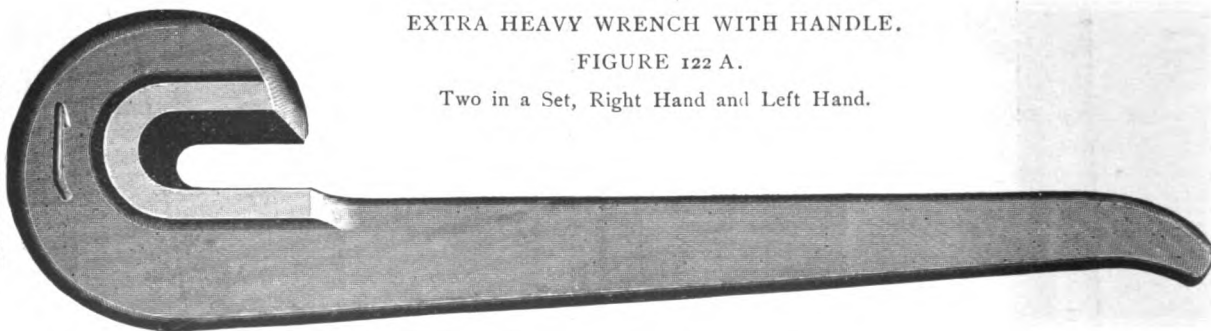
Right Hand Wrench.

EXTRA HEAVY WRENCH WITH HANDLE.

FIGURE 122 A.

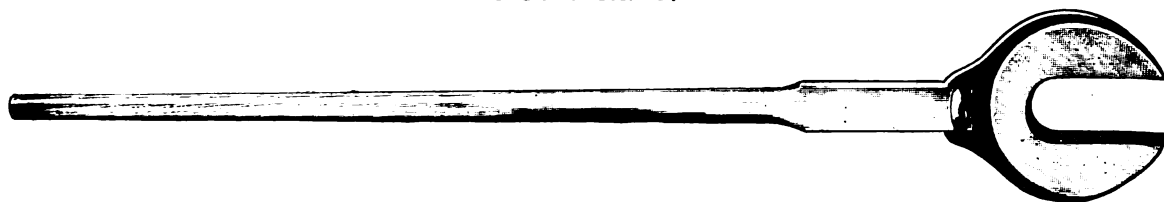
Two in a Set, Right Hand and Left Hand.

Left Hand Wrench.



SWIVEL TOOL WRENCH.

FIGURE 122.—B.

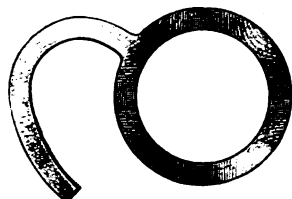


For Carrying Bit from Forge to Well Mouth and inserting the Pin in the Box.

DRILLING TOOLS.

TOOL GUAGE.

FIGURE 123.



One for each size bit.

PROTECTORS.

FOR PIN.

FIGURE 124.



FOR BOX.

FIGURE 124 A.



To protect the Threads on Drilling Tools.

PATENT TAPER JOINT.

FIGURE 125.



Used on all tools unless otherwise ordered.

JOINTS.

PIN.

FIGURE 126.



BOX.

FIGURE 127.



STRAIGHT.

FIGURE 128.



SUBSTITUTES.

TAPER.

FIGURE 128 A.



PIN SUB.

FIGURE 128 B.



To connect Tools to Tubing.

To connect a tool with one thread to another with a different thread.

DRILLING TOOLS.

SOLID HOOK WITH PIN.

FIGURE 129.



For raising Drilling Tools
in the Derrick.

SWIVEL HOOK
WITH PIN.

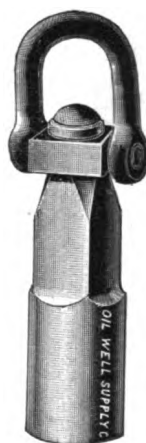
FIGURE 130.



For raising Drilling Tools
in the Derrick.

SWIVEL BOX.

FIGURE 131



For raising Drilling Tools
in the Derrick.

SPOUDDING BIT.

FIGURE 133.

(13 INCHES OR LESS).



EXTRA LARGE SPOUDDING BIT.

FIGURE 133 A.

(OVER 13 INCHES).



SOLID EYE WITH BOX.

FIGURE 131 A.



For raising Drilling Tools
in the Derrick.

For drilling in Earth down to the Rock.

DRILLING TOOLS.

PATENT ROPE SOCKET.

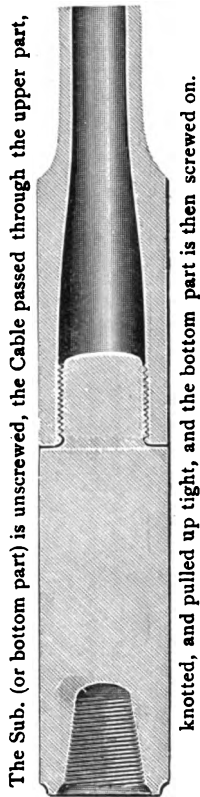
FIGURE 134.



PATENT ROPE SOCKET,

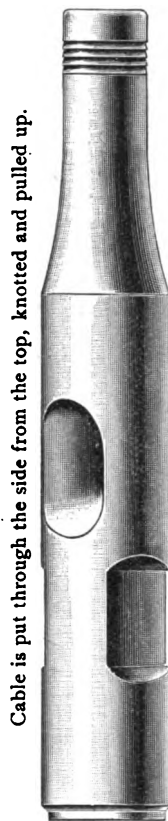
WITH SUB.

FIGURE 134 A.



NEW ERA ROPE SOCKET.

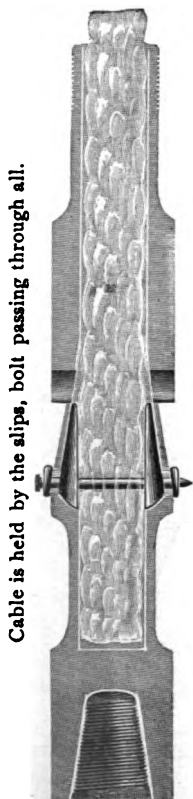
FIGURE 134 B.



SMITH'S PATENT

ROPE SOCKET.

FIGURE 134 C.



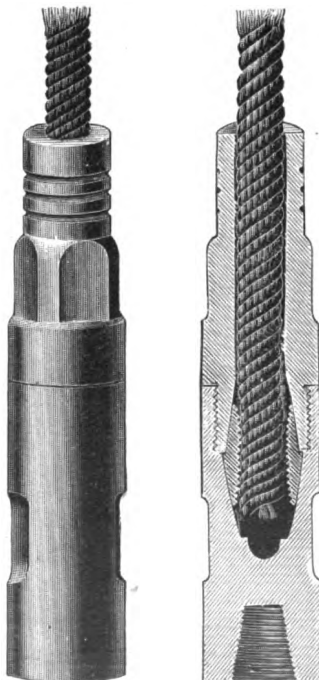
SLIP FOR
SMITH'S PATENT
ROPE SOCKET.

FIGURE 134 D.



CLARK'S PAT. ROPE SOCKET.

FIGURE 134 E. FIGURE 134 F.



Cable is put through upper part, slips are placed around it, and Cable pulled up.

WING ROPE SOCKET.

FIGURE 135.



Rivets are put through Wings and Cable, and drawn together tightly.

DRILLING TOOLS.

ROUND REAMER.

FIGURE 136.

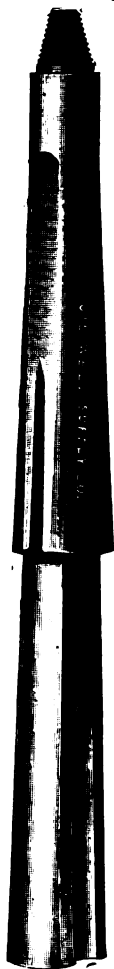
To make the hole round.



STAR REAMER.

FIGURE 137.

To straighten a crooked hole and to make it round.

CONICAL HEAD
REAMER—FIG. 137 A.

To ream out hole drilled passed lost tool.

ROUND BIT.
FIGURE 137 B.

To drill past tools lost in the well.



SPECTACLES.

FIGURE 138.



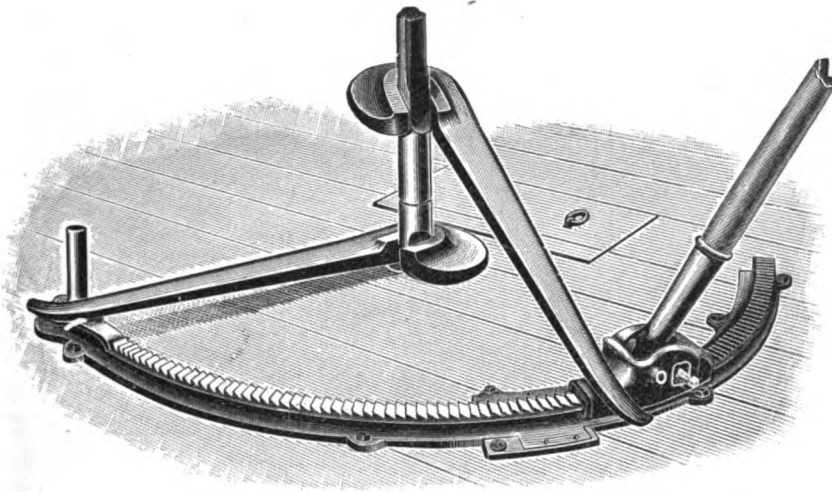
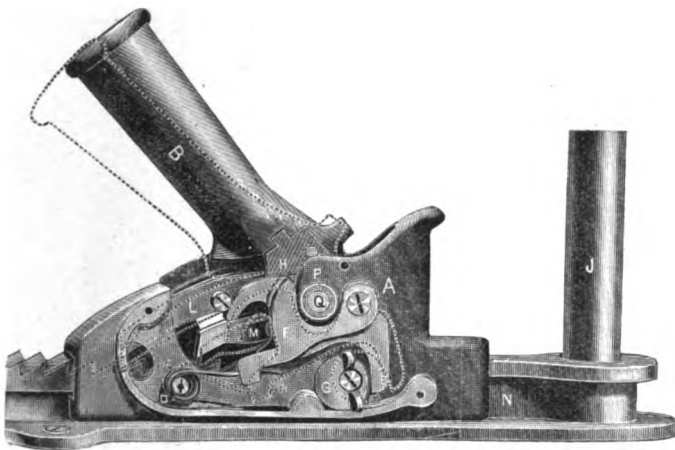
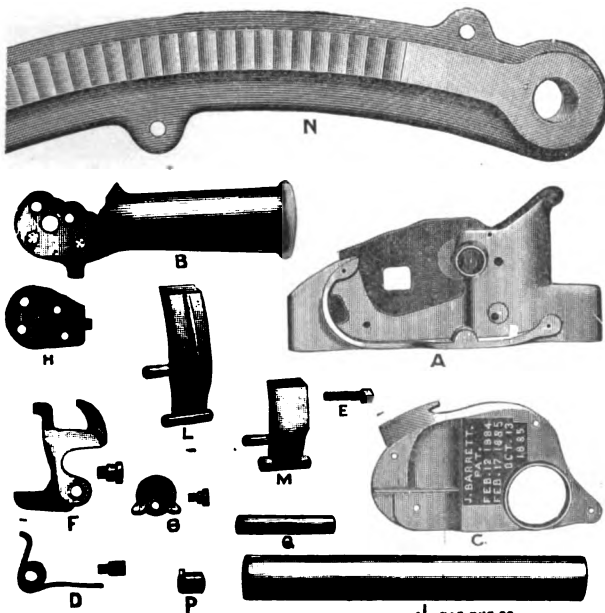
For Carrying Tools.

WRENCH CIRCLE.—FIGURE 139.

To hold point of Wrench Bar when screwing or
unscrewing Tools.WRENCH CIRCLE HOOK.
FIGURE 139 B.

WRENCH BAR.—FIGURE 139 A.



DRILLING TOOLS.**BARRETT'S PATENT OIL WELL JACK FOR TIGHTENING AND LOOSENING JOINTS.****FIGURE 139 C.****SECTIONAL VIEW.
FIGURE 139 D.****PARTS.
FIGURE 139 E**

In this Jack there is an improved reversing appliance, by which the spring levers are dispensed with. The carriage can be moved on or off the rack by holding the handle at the position shown in cut when set for reversing.

- A.—Base.
- B.—Socket Lever.
- C.—Shield.
- D.—Spring.
- F.—Lowering Block.
- G.—Eccentric.
- H.—Socket Side Plates.
- J.—Two inch Wrench Pin.
- L.—Long Pawl.
- M.—Short Pawl.
- N.—Rack.
- P.—Bushing.
- Q.—Fulcrum Pin.

SCREWS FOR ABOVE.

- D.—Spring Screw.
- E.—Lifting Screw.
- F.—Low Block Screw.
- G.—Eccentric Screw.
- L.—Long Pawl Screw.
- M.—Short Pawl Screw.

DRILLING TOOLS.

WINGED SUBSTITUTE.

FIGURE 140.



Sometimes placed just above the bit to keep it from glancing off, also above round reamer to keep it to its place.

STAR BITS.

THREE WINGED.

FIGURE 141.



FOUR WINGED.

FIGURE 142.



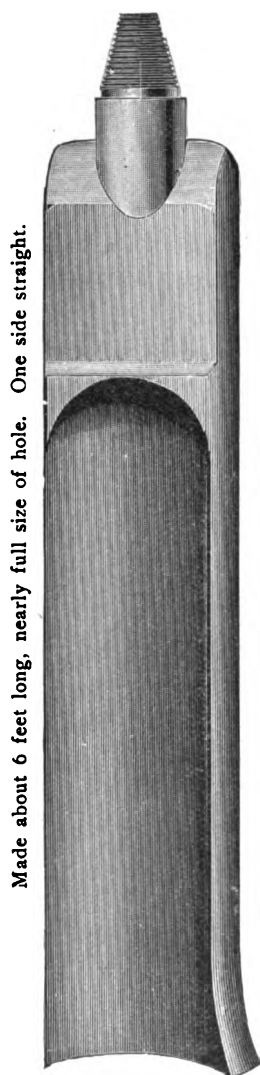
To keep a hole straight when drilling in rock that has crevices or when the strata are inclined. The bits being long and nearly the full size of the hole are not liable to glance.

Very often used as Reamers.

DRILLING TOOLS.

KEARNES' PATENT HOLE STRAIGHTENING BIT.

FIGURE 145.



Made about 6 feet long, nearly full size of hole. One side straight.

To straighten a crooked hole or to cut off a protuberance.

FISHING TOOLS.

MACK'S PATENT HOLE STRAIGHTENER.

COMPLETE.

FIGURE 146.



SECTIONAL VIEW OF SLIPS.

FIGURE 146 A.

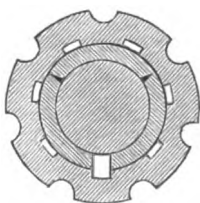


SLIGHTLY TAPERED.

Put on Auger Stem at various places to keep bit in a straight line.
Used when the hole varies from a true vertical line.

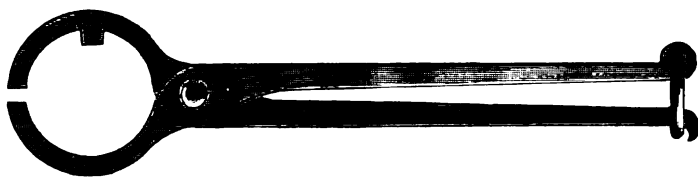
SECTIONAL TOP VIEW.

FIGURE 146 B.



TONGS FOR TURNING COLLAR.

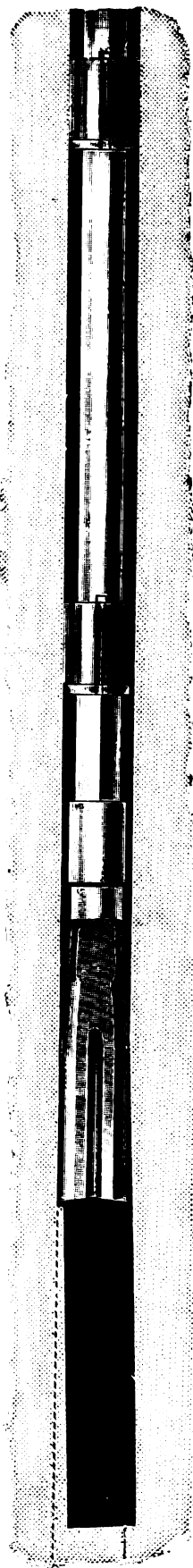
FIGURE 146 C.



Slips are first put on Stem, Collar is then screwed on the Slips, binding them to the Stem by the teeth, which are slightly tapered. The Collar is large enough to go over the Collars on the Stem.

FIGURE 146 D.

Showing Crooked Hole, Bit and Stem with straightening devices on Stem to force the Bit to go straight.



FISHING TOOLS.

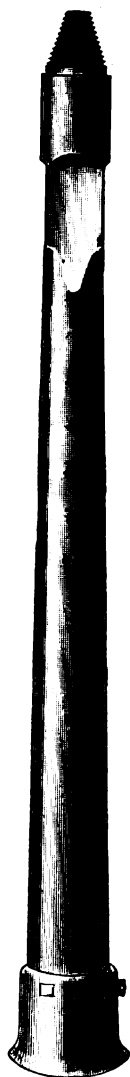
HORN SOCKET.

FIGURE 150.



HORN SOCKET WITH BOWL.

FIGURE 150 A.



To take hold of a loose tool in the well. By putting on the bowl the socket can be used in a larger hole.

LONG FRICTION SOCKET.

FIGURE 151.

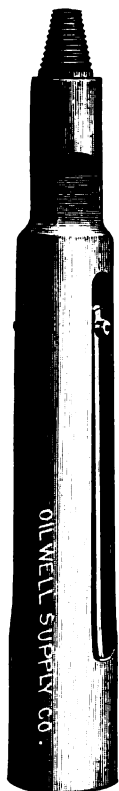


To take hold of Tools when they are loose in the well. It takes a stronger hold than the Horn Socket.

FISHING TOOLS.

SLIP SOCKET.

FIGURE 152



To take hold of any tool when the pin is broken off.

SLIP SOCKET,
WITH BOWL.

FIGURE 152 B.



MUD SOCKET.

FIGURE 154.



PIN SOCKET.

FIGURE 155.



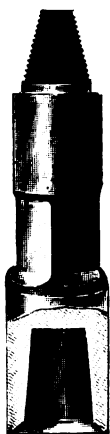
To take hold of a pin.

SHORT
FRICTION SOCKET.

FIGURE 157.

SECTION OF
SHORT
FRICTION SOCKET.

FIGURE 158.



To take hold of a lost tool when a strong friction hold is required. It is made of steel, is very strong, and will stand heavy jarring.

SECTION OF
PIN SOCKET.

FIGURE 156.



To clean mud or sand out of a well. Used on drilling Tools.

FISHING TOOLS.

COLLAR SOCKET.

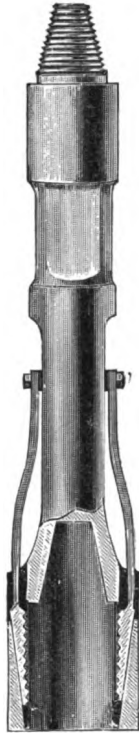
FIGURE 160.



To take hold of the collar of Tool lost in the well.

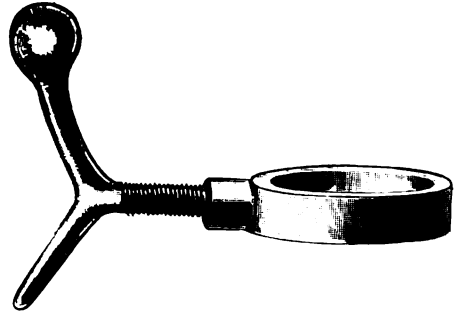
SECTION OF
COLLAR SOCKET.

FIGURE 160 A.



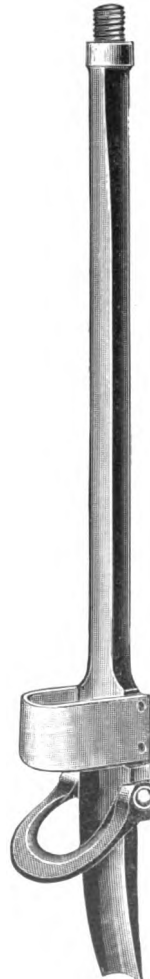
TEMPER SCREW
YOKE WITH BALL HEAD
T SCREW.

FIGURE 116 B. B.



HORSE SHOE
ROPE KNIFE WITH
GUIDE.

FIGURE 169 C.



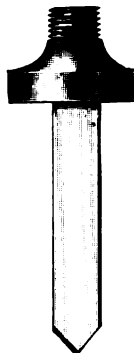
SOCKET
FOR TAKING OUT
ROPE SOCKET.

FIGURE 160 D.



ROPE SOCKET
DRILL.

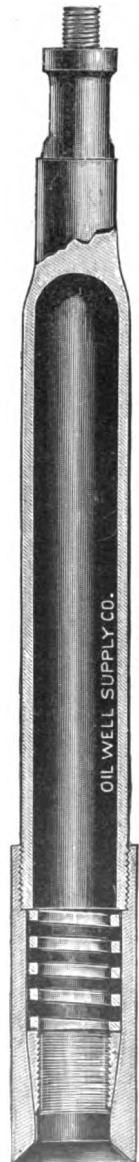
FIGURE 160 E.



To drill rope out of a Rope
Socket so that socket, Figure 160 D
can take hold.

Tongue goes inside of Rope
Socket, other part outside. The
two slips catch and hold the
socket fast.

SUCKER ROD COMBINATION SOCKET.—FIGURE 196 A.



For taking out Sucker Rods.

FISHING TOOLS.

COMBINATION
SOCKET.

FIGURE 159.

SECTION OF
COMBINATION
SOCKET.

FIGURE 159 B.



To take hold of pin, collar, shank or rope socket.

BULL DOG SOCKET.

FIGURE 160 B.

SECTION OF BULL
DOG SOCKET.

FIGURE 160 C.



To take hold of pin. It has no spring.

PIN OR COMBINATION SOCKET WRENCH.

FIGURE 159 A.



To screw up or unscrew a pin or combination socket.

FISHING TOOLS.

ROPE SPEAR.
FIGURE 161.



TWO WING
ROPE GRAB.
FIGURE 162.



THREE WING
ROPE GRAB.
FIGURE 163.



SUCKER ROD JARS.
FIGURE 164.



To attach to rope knife to cut rope in the well.

Used on a string of Sucker Rods.

To catch end of cable when it has parted in the well.

FISHING TOOLS.

ADJUSTABLE
ROPE KNIFE.

FIGURE 166.

To be used on a string of sucker rods or on sand line and sinker, Figure 169 B.



VALVE ROPE KNIFE.

FIGURE 165.



V ROPE KNIFE.

FIGURE 167.



HOOK ROPE KNIFE.

FIGURE 168.

HORSE SHOE
ROPE KNIFE.

FIGURE 169.

DETAIL VIEW OF
HORSE SHOE ROPE
KNIFE.

FIGURE 169 A.



All these rope knives are to cut the cable when the tools are fast in the well.

To be used on a string of sucker rods or on sand line with sinker, Figure 169 B.

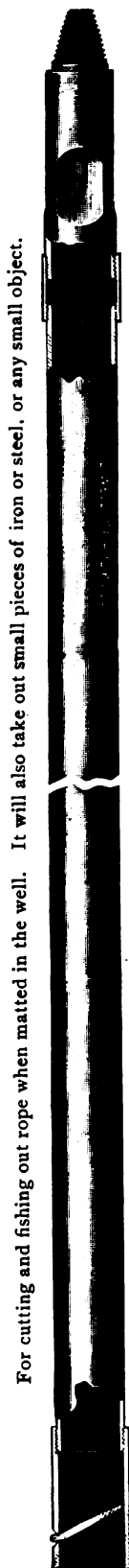
Figure 169 shows the horse shoe knife when cutting the rope.

FISHING TOOLS.

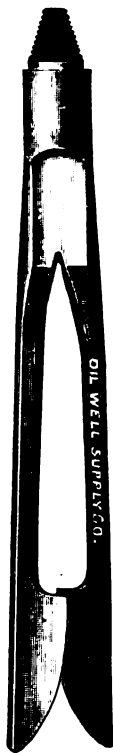
SINKER FOR
ROPE KNIFE.
FIGURE 169 B.
(FORMERLY 168 A).



MOUSE TRAP.
FIGURE 170.



ROPE CHOPPER.
FIGURE 170 A.



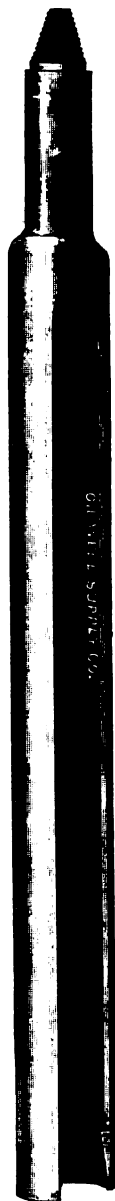
To chop up rope in the well.

HOLLOW REAMER.
FIGURE 171.



Used to straighten a crooked hole, also to remove the earth and sediment around tools when they are fast, the object being to make room enough for the fishing tool to take hold.

GRAB.
FIGURE 172.



To take hold of any loose tool below the collar when the pin is broken off.

FISHING TOOLS.

TUBING SPEAR,

WITH SOCKET.

FIGURE 174.



SECTION OF TUBING SPEAR,

WITH SOCKET.

FIGURE 174 A.



Tubing Spears are made to screw either on Drilling Tools or on Tubing, as ordered.

BOOT JACK.

FIGURE 173.



To take hold of lower half of Jars,
under the head when the upper
half is broken off.

To seize tubing when unscrewed or broken off.

FISHING TOOLS.

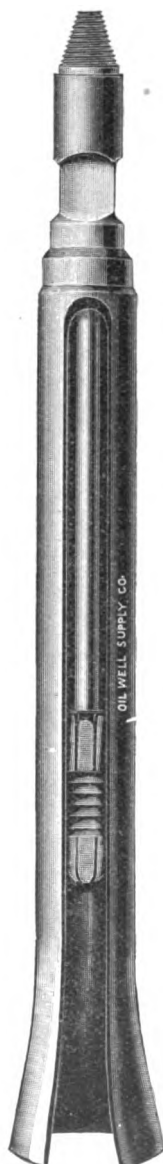
TUBING SPEAR,
WITH EXPANSION SOCKET.

FIGURE 174 B.



TUBING SPEAR,
WITH EXPANSION SOCKET.

FIGURE 174 C.



Tubing Spears are made to screw either on Drilling Tools or on Tubing, as ordered.

TUBING SPEAR,
WITHOUT SOCKET.

FIGURE 174 D.



With Tubing Coupling.

To take out tubing when
unscrewed or broken
off.

SIDE JAR SOCKET.
FIGURE 176 A.



To catch the rein of broken jars.

To seize tubing when unscrewed or broken off and dropped below Packer.

Figure 174 B shows Socket contracted to pass through small casing and Packer.

Figure 174 C shows Socket expanded in large hole to guide the tubing to the Spear.

FISHING TOOLS.

CENTER JAR SOCKET.

FIGURE 176 C.



JAR TONGUE SOCKET.

FIGURE 176 B.



SAND PUMP OR
BAILER GRAB.

FIGURE 177.



JAR TONGUE SOCKET
WITH BAND.

FIGURE 176 D.



To catch the tongue of lower
half of Jars.

SECTION OF JAR
TONGUE SOCKET
WITH BAND.

FIGURE 176 E.



To take out Sand Pump or
Bailer when lost in
the Well.

FISHING TOOLS.

SPUD FOR SMALL HOLE.

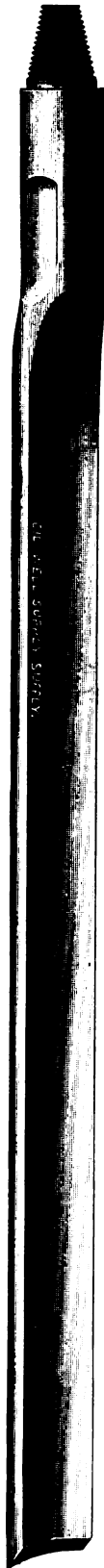
FIGURE 178.



From 4 to 16 feet in length.

SPUD FOR LARGE HOLE.

FIGURE 179.



For spudding around and loosening a bit or reamer when fast in the well, if disconnected from the rest of the tools.

SPEAR.

FIGURE 180.



For spudding around and loosening the whole or a part of a set of tools when fast in the well. Made from 40 to 80 feet in length.

A Spear is much like a Spud, except that it is very much longer.

FISHING TOOLS.

WHIP STOCK.

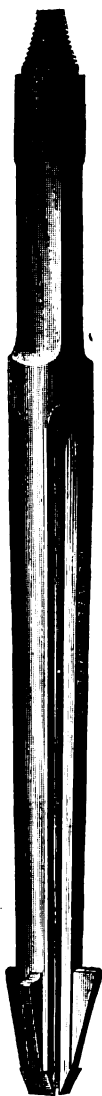
FIGURE 180 A.

Used in drilling past a set of tools when fast. There is a hole in the bottom of the whip stock which goes over the end of the rope socket or pin. The whip socket causes the tools used in drilling past to glance into the side of the well.



WHIP STOCK GRAB.

FIGURE 180 B.



For removing whip stock from well.

HOOK FOR
STRAIGHTENING BIT
OR REAMER.

FIGURE 181.



To straighten up a bit or reamer lost in the well, when it lies against or has been jammed in the wall. The hook goes around the shank.

ALLIGATOR GRAB.

FIGURE 183 B.

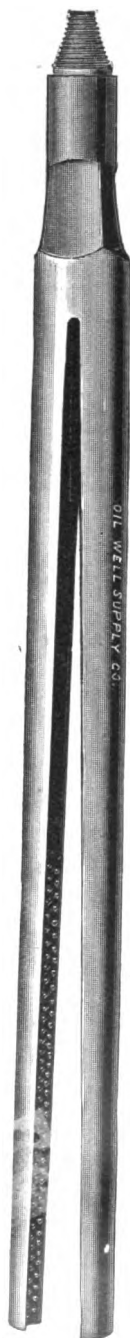


To take hold of a piece of steel or other small article that has been lost in the well.

FISHING TOOLS.

TWO WING RASP.

FIGURE 184.



For rasping off or reducing a collar on lost tools, so that a fishing tool can take hold.

MANDREL SOCKET.

FIGURE 185.



To take hold of casing that has collapsed or become broken.

SECTION OF
MANDREL SOCKET.

FIGURE 186

GRAB FOR
PACKER RUBBER.

FIGURE 187.



To take out rubber that has come off of the packer.

FISHING TOOLS.

SUCKER ROD SPEAR.

FIGURE 188.



To take hold of sucker rods under the collar when broken off or disconnected in the well.

Used on a string of Sucker Rods.

TWIST DRILL.

FIGURE 189.



When the top of a lost tool has been battered down so large that it fills the hole, and there is not room for a fishing tool to take hold, this tool drills a hole in the top of the lost tool in which hole is inserted the Twist Drill Spear, Figure 190. Used on Tubing.

TWIST DRILL SPEAR.

FIGURE 190.



To catch a lost tool in the hole made by the Twist Drill, (Figure 189). Used on Drilling Tools.

VALVE CUP GRAB.

FIGURE 191.



To take out valve cups when they have dropped from the valve.

Used on a string of Sucker Rods.

ROPE WORM.

FIGURE 192.



To take rope out of Tubing. Used on a string of Sucker Rods.

FISHING TOOLS.

JAR KNOCKER.

FIGURE 193.



To knock Jars loose when
locked together in the well.

SUCKER ROD
ROPE GRAB.
FIGURE 194.

To take out rope when
broken off in the well.
Used on a string of
Sucker Rods.

COMMON
SUCKER ROD SOCKET.

FIGURE 195.



To take Sucker Rods out
of a well when broken off
or disconnected.

HITCHCOCK PATENT
SUCKER ROD SOCKET.

FIGURE 196.



To take Sucker Rods out
of a well when broken off or
disconnected.

Used on a string of Sucker
Rods.

FISHING TOOLS.

CASING SPEARS.

MACKS' PATENT.

CARRUTHERS' PATENT.

FIGURE 197.



FIGURE 197 A.

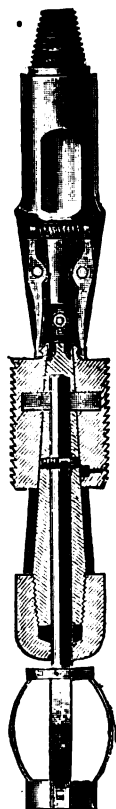


FIGURE 197 B.



Sectional Views.

FIGURE 197 C.

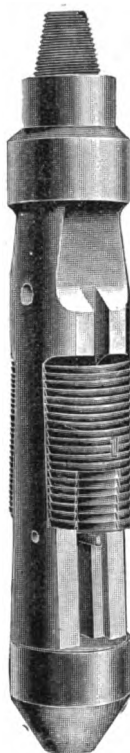
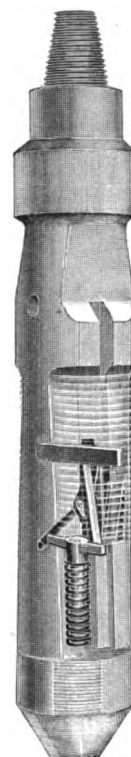


FIGURE 197 D.

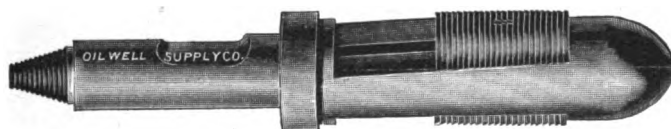


Sectional View.

To remove casing from the well. If the casing cannot be taken out after the spear has taken hold, the hold can be broken by lowering the tools on the spear, which releases the slips, and the spear can then be drawn out.

BULL DOG CASING SPEAR.

FIGURE 198.

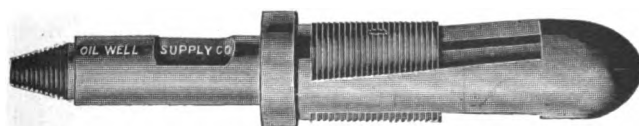


Ready to put in Well.

When hold of Casing.

 THESE CUTS ARE TRANSPOSED.

FIGURE 198 A.



When hold of Casing.

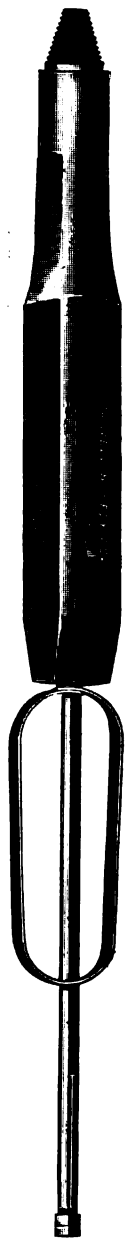
Ready to put in Well.

To remove casing from the Well. It will take a strong hold but will not let go.

FISHING TOOLS.

CASING SPLITTER.

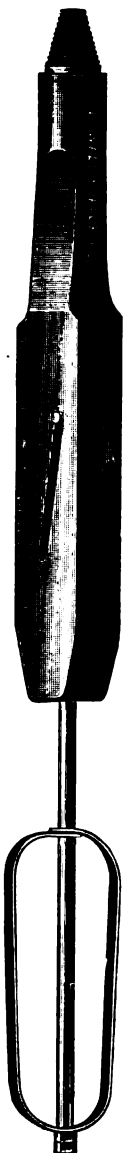
FIGURE 199.



Ready to be put in Well.

For splitting casing to let the sediment around it run into the well, so that the casing may be removed.

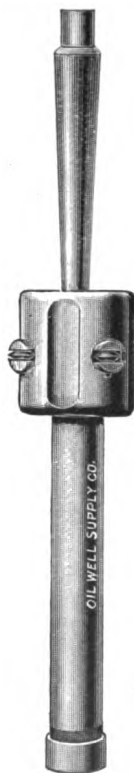
FIGURE 200.



As it is, when ready to split Casing.

CASING CUTTER.

FIGURE 202.



To cut casing at any point in the well when the entire string of casing cannot be pulled.

Used on Tubing.

WEDGE AND JAR FOR CASING CUTTER.

FIGURE 202 A.



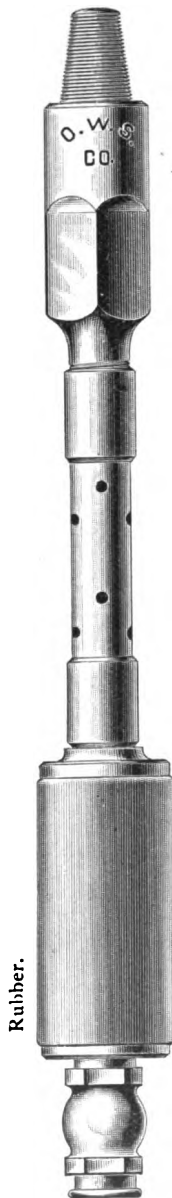
To expand the cutters in Figure 202. A rope is tied in the eye and it is let down through the Tubing.

FISHING AND CLEANING TOOLS.

SWABS.

COMMON SWAB.

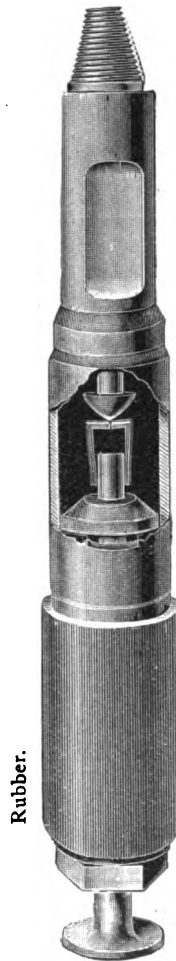
FIGURE 205 A.



To remove Paraffine and heavy Oils from the well.
Used on Drilling Tools.

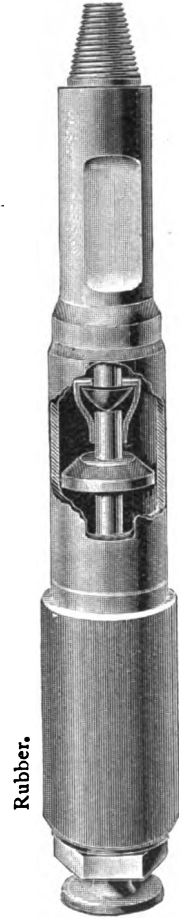
BALDWIN'S PATENT SWAB.

FIGURE 205 B.



Rubber.

FIGURE 205 C.



Rubber.

To remove Paraffine and heavy Oils from the well.
Figure 205 C shows the Valve raised to allow the Paraffine and heavy Oils to pass above the Rubber.
If the load is too heavy, the swab is forced to the bottom of the well and the weight is rested on the foot which makes the valve catch as in Figure 205 C, and the Swab can then be raised.

MILLING TOOL.

FIGURE 203



To cut a Pin on Tools in the Well when it has been broken off.
Used on Tubing.

TUBING RING WITH WEDGES.

FIGURE 204.



To prevent Tubing's dropping in the well while pulling it. It fits in the Casing Head.

CLEANING TOOLS.

COMBINATION BIT AND MUD SOCKET.

FIGURE 206.



To clean Mud and Sediment out of old wells. The bit loosens the mud, which is forced into the Tube and thus removed.

SECTION.
FIGURE 207.

MOODY'S PATENT SAND PUMP.

FIGURE 208.



For cleaning out old wells. The bailer is forced into the mud by jarring, and the mud is forced into the Tube by the hydrostatic pressure of the water.

SECTION.
FIGURE 209.

UNDER REAMING AND DRILLING TOOLS.

MCCLEARY'S PATENT ENLARGING BITS.

FIGURE 210.

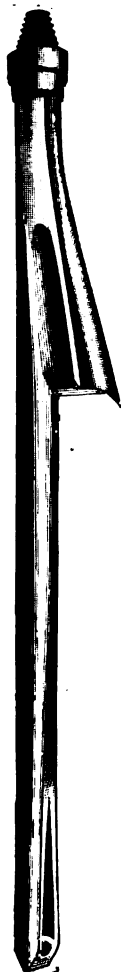
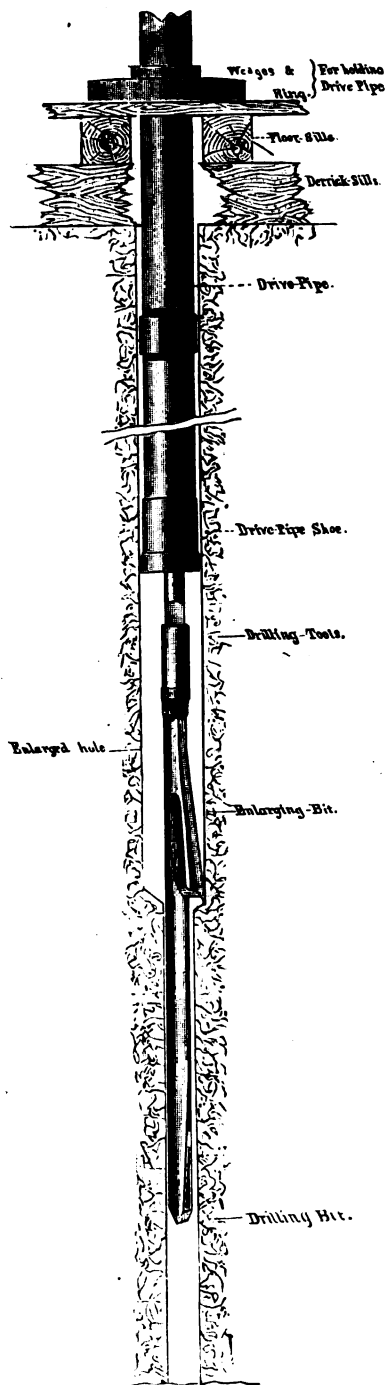


FIGURE 211.



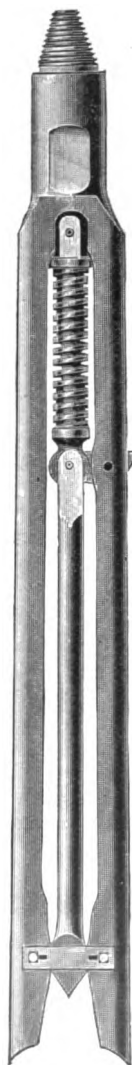
The Patent Enlarging Bit is an indispensable tool in many formations. It drills ahead of the Drive Pipe or Casing a hole of the exact size of the out side of the shoe or of the couplings, so that the Drive Pipe or Casing can be forced down with but little difficulty. The Central Bit drills in advance of the Enlarging Bit.

This tool has been thoroughly tested in various parts of the world. It cannot get out of order, and it is safe in the hands of the most inexperienced.

UNDER REAMING AND DRILLING TOOLS.

MACK'S PATENT UNDER REAMER.

FIGURE 211 A.

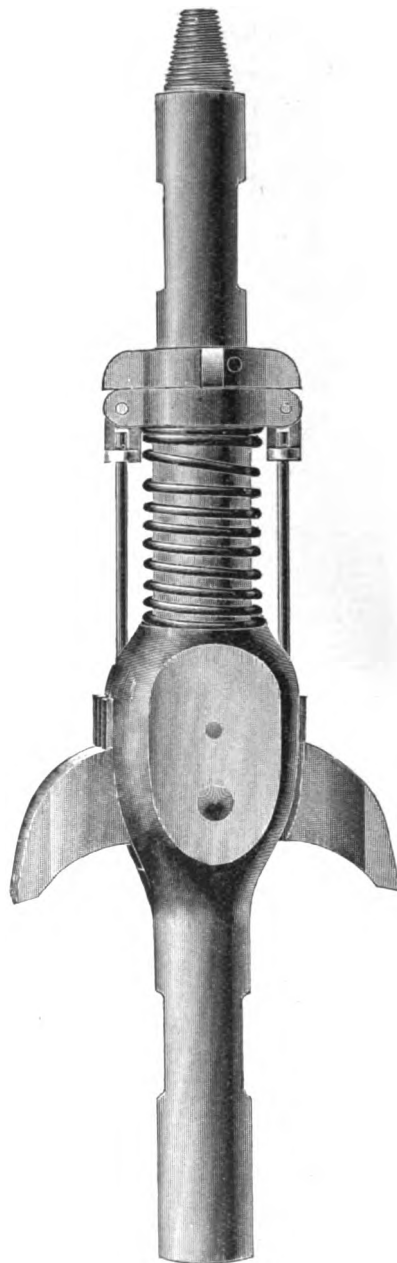


Latch.

To enter the pipe, force the spring up until the tongue is relieved, when the reamers can be drawn together and remain so until the tool is below the pipe, when the spring will force the tongue between the reamers. When raising, the latch will strike against the end of the pipe and the spring will be forced up again.

RUSSIAN UNDER REAMER.

FIGURE 211 B.

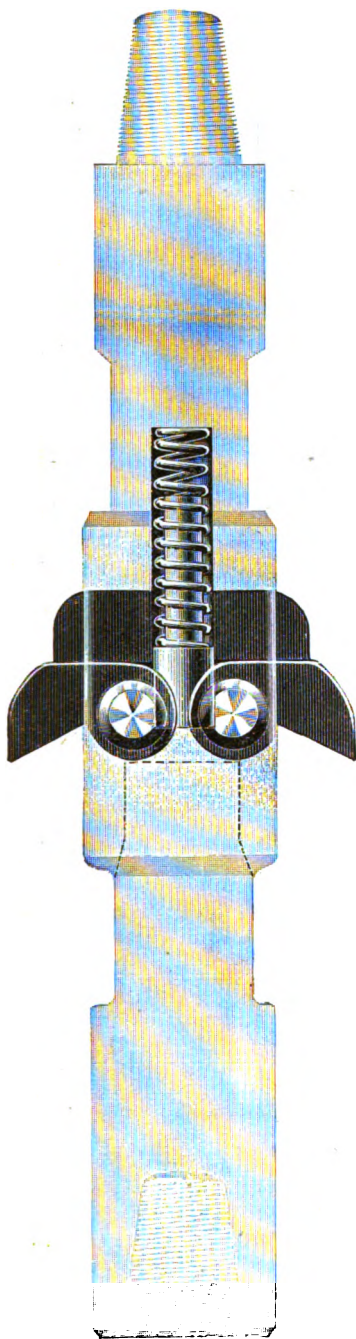


To enter the pipe, force the reamers down, where they will remain until the tool is below the pipe when they will spring out and remain so. When raising the tool the reamers will be forced down by striking the end of the pipe. A bit for drilling is attached to the bottom.

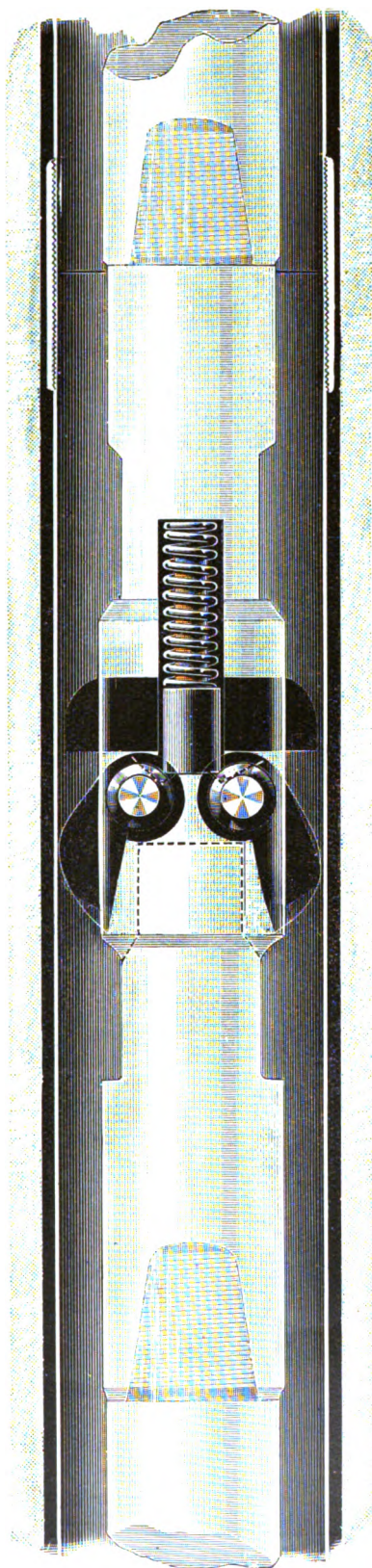
AUSTRIAN UNDER REAMER.

FIGURE 212 A.

FIGURE 212 B.

COMPLETE.
FIGURE 212.

When being lowered through the Pipe.

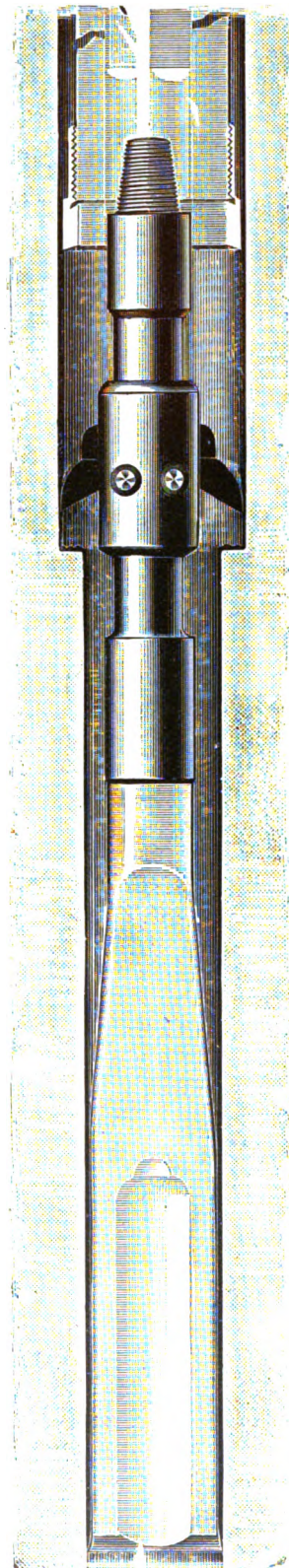


Drive Pipe.

Shoe.

Enlarged hole.

Bit drilling small hole ahead of reamer.



For Drilling and Reaming in soft formations. The Bit is screwed to the end of the Reamer and makes a hole the size of the inside of Drive Pipe or Casing. The Reamer cutting out enough more to allow the Drive Pipe or Casing to sink freely. The Drive Pipe or Casing is supported by clamps, allowing enough space for the Reamer to work without striking the cutters against the Shoe. Figure 212, is Reamer Complete. Figure 212 A, is Reamer passing through Drive Pipe or Casing. Figure 212 B, is Reamer and Bit working in well. These are all Phantom Views.

FOR CLEANING THE HOLE.

SAND PUMPS.

MORAHAN PATENT SAND PUMP.—FIGURE 225.



SMITH OR COMBINATION SAND PUMP.—FIGURE 226.



ROBERTS PATENT SAND PUMP.—FIGURE 227.



ROBERTS PATENT SAND PUMP, SWIVEL BAIL.—FIGURE 228.



CHICKERING PATENT SAND PUMP.—FIGURE 228 A.



The bail is screwed on the inside of tube and made flush with the outside.

BRADEN PATENT SAND PUMP.—FIGURE 228 B.

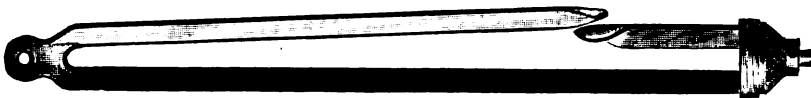


SAND PUMP.

For removing the debris drillings, sediment, &c.,
made by the bits or reamers.

PLUNGER FOR MORAHAN SAND PUMP.

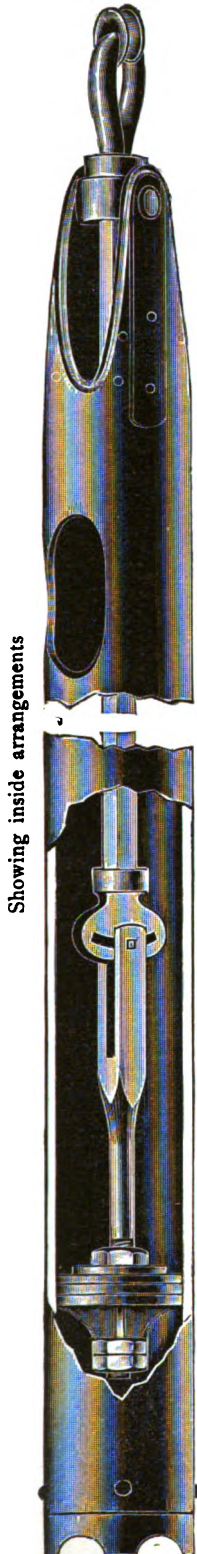
FIGURE 229.



SAND PUMP, &c.

CHICKERING'S
PATENT SAND PUMP.

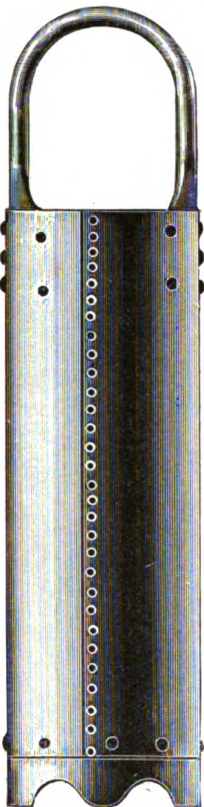
FIGURE 228 A.



to replace illustration on page 110.

CONDUCTOR BAILER.

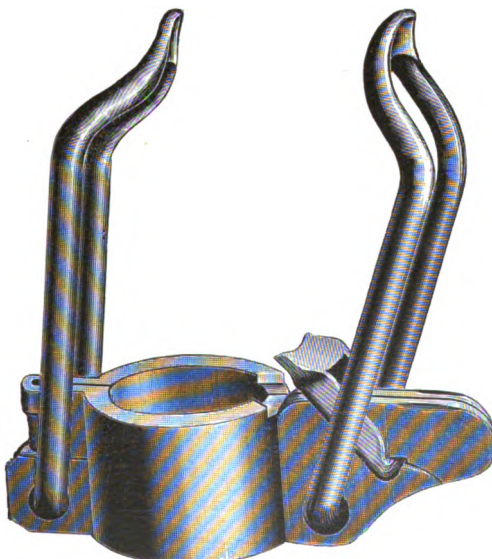
FIGURE 230 C.



For Bailing out large holes.

SCOTT'S PATENT ELEVATOR.

FIGURE 282 B, AND 314 A.



Raising the front rein throws the latch in place.

SAND PUMP VALVE.

BANNISTER'S

FIGURE 235.

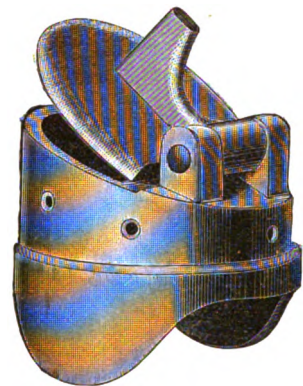


Figure 235, page 111, should be 231 A, being a common valve with iron hinge.

HOLLOW DRY
HOLE PLUG.
WITH WEDGE.
FIGURE 434 B.



HOLLOW DRY
HOLE PLUG.
WITH PLUG WEDGE.
FIGURE 434 C.



The hollow plug is first put in place. The wedge is then driven in it. The large head is an additional plug.

FOR CLEANING THE HOLE.

BAILERS.



WROUGHT IRON BAILER WITH TWO VALVES.—FIGURE 230 A.



SPIRAL WELDED STEEL BAILER, (VERY LIGHT).—FIGURE 230 B.



COMMON DART VALVE FOR SAND PUMPS.

FIGURE 234.

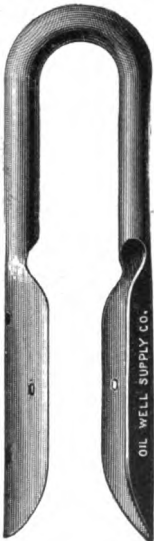


MORAHAN SAND PUMP VALVE.

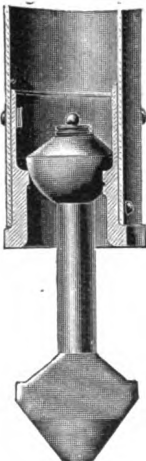
FIGURE 231.



BAILER BAIL.
FIGURE 232.



BIRGE'S PATENT
DART VALVE FOR
SAND PUMPS.
FIGURE 233.



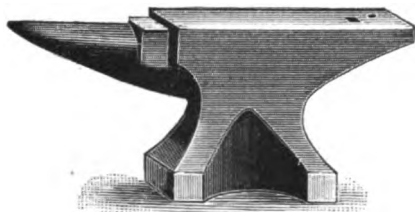
BANNISTER SAND PUMP VALVE.

FIGURE 235.



FORGE TOOLS &c.

ANVIL.
FIGURE 240.



BALL PEEN HAMMER.
FIGURE 242.



BLACKSMITHS' TONGS.
FIGURE 241.



BLACKSMITHS' SLEDGES.

DERRICK LAMP.
FIGURE 244.



STRAIGHT PEEN.
FIGURE 243.

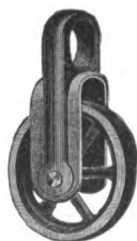


CROSS PEEN:
FIGURE 243 A.



PULLEYS FOR FORGE.

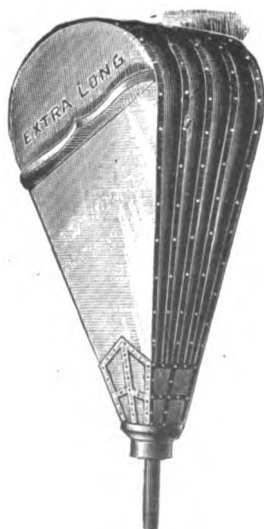
THREE INCH.
FIGURE 245.



FIVE INCH.
FIGURE 246.



BELLOWS.
FIGURE 247.



GROOVED WHEELS FOR TELEGRAPH LINE.

No. 1.

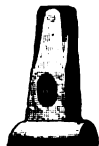
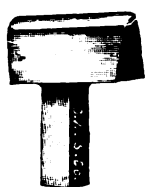
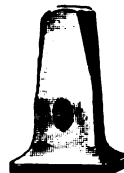
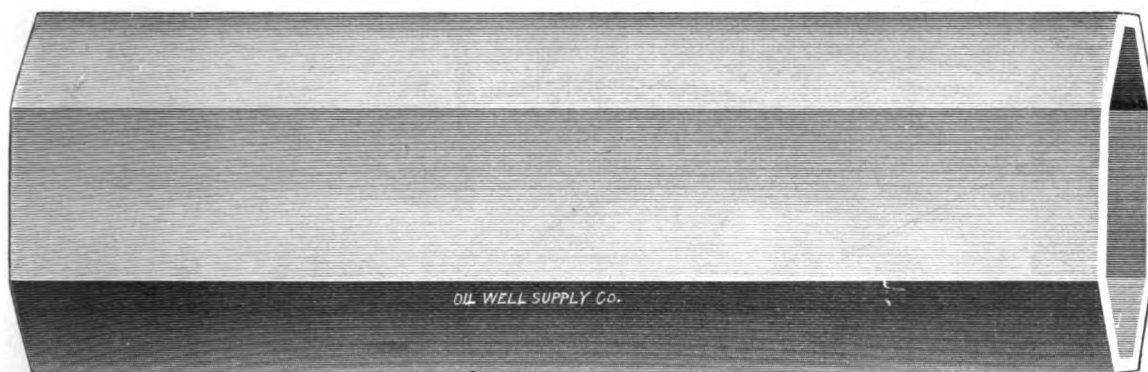
FIGURE 248.



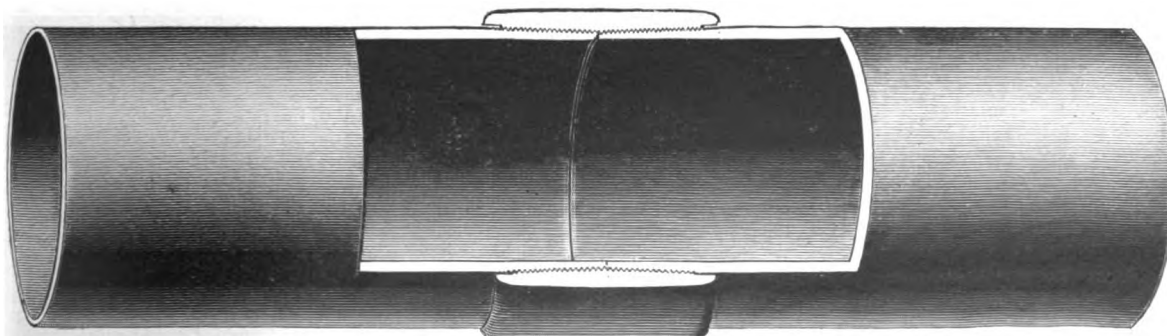
No. 2.

FIGURE 249.



BLACKSMITHS' TOOLS.**HOT CHISEL.****FIGURE 250.****COLD CHISEL.****FIGURE 251.****TOP SWEDGE.****FIGURE 252.****BOTTOM SWEDGE.****FIGURE 253.****TOP FULLER.****FIGURE 254.****BOTTOM FULLER.****FIGURE 255.****ROUND PUNCH.****FIGURE 256.****SQUARE PUNCH.****FIGURE 257.****HARDY.****FIGURE 258.****FLATTER.****FIGURE 259.****SET HAMMER.****FIGURE 259 A.****TO COMMENCE WELL.****WOODEN CONDUCTOR.****FIGURE 260.**

Usual size 8 inches inside diameter.

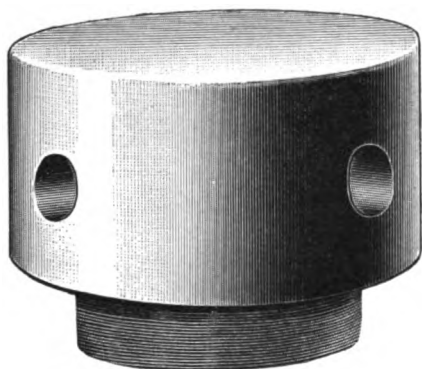
DRIVE PIPE.**FIGURE 261.**

Usual size 8 inches inside diameter.

DRIVE PIPE HEADS AND SHOES.

SOLID DRIVE PIPE HEAD.

FIGURE 262.



MALLEABLE IRON DRIVE PIPE HEAD.

FIGURE 262 A.



For small pipe.

HOLLOW DRIVE PIPE HEADS.

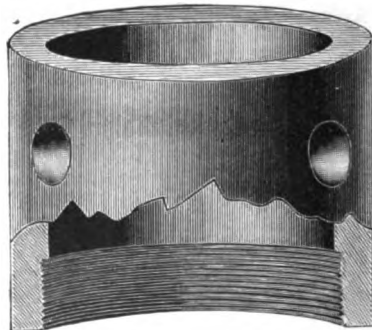
MALE.

FIGURE 262 B.



FEMALE.

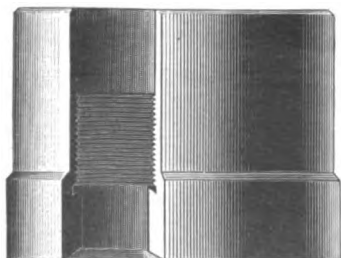
FIGURE 262 C.



PATENT DRIVE PIPE SHOES.

SHORT, TO SCREW ON.

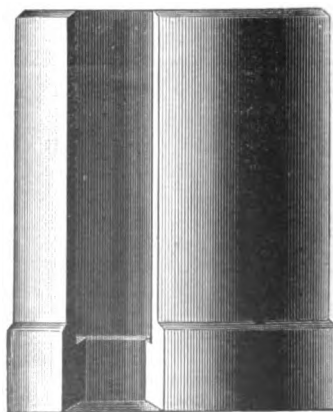
FIGURE 263



The end of the Drive Pipe is cut on a bevel which fits in the bevel in the shoe, thus preventing the pipe from being forced through the shoe by heavy drilling.

LONG, TO SHRINK ON.

FIGURE 264.



DRIVE PIPE JACKS, &c.

PIPE SWEDGES.

FIGURE 265.



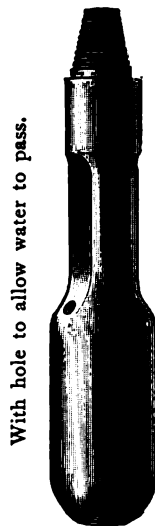
Regular.

FIGURE 265 A.



Fluted to allow water to pass.

FIGURE 265 B.



With hole to allow water to pass.

For straightening, in the well, Pipe, that has bulged in.

RING AND WEDGES.

FIGURE 266.



For pulling or holding up Drive Pipe or Casing.

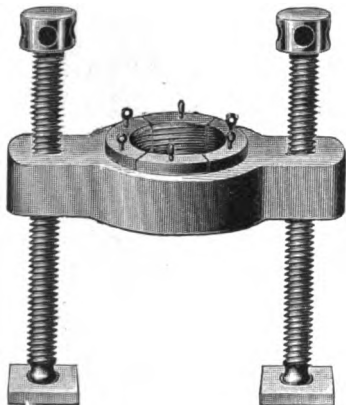
This ring is very heavy and is specially intended for pulling long strings of heavy Drive Pipe.

Screw Jacks are sometimes used with it, but generally Hydraulic Jacks, as shown in Figures 267 and 268.

The ring shown in Figure 266 A is much lighter, and is used for short strings of Drive Pipe or for Casing.

RING AND WEDGES WITH SCREW JACKS COMBINED.

FIGURE 266 A.

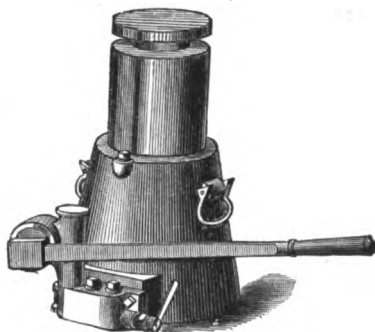


HYDRAULIC LIFTING JACKS.

For pulling Drive Pipe or Casing out of the Well.

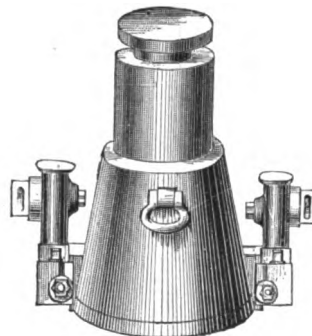
SINGLE PUMP.

FIGURE 267.



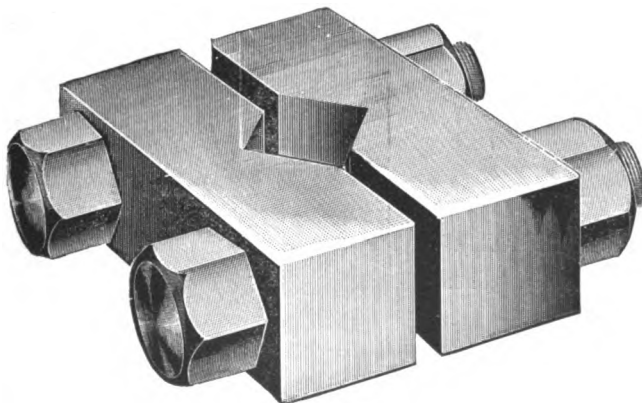
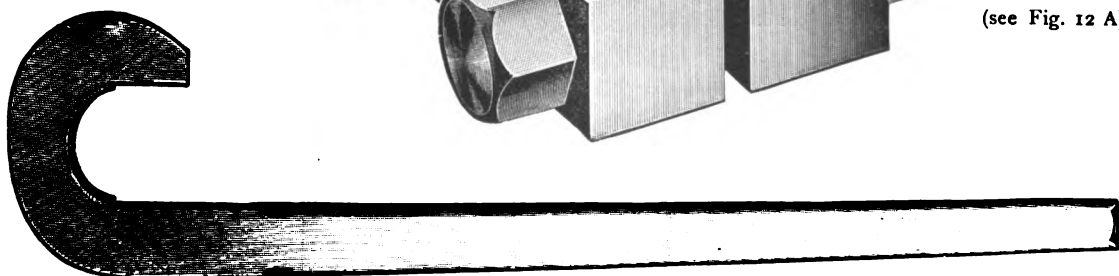
DOUBLE PUMP.

FIGURE 268.



WRENCH FOR DRIVE CLAMPS.

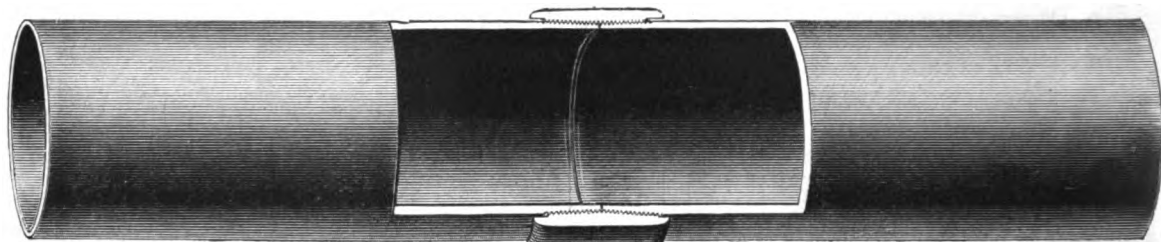
FIGURE 270.



DRIVE CLAMPS.

FIGURE 269.

Bolted on Auger Stem to drive Pipe, (see Fig. 12 A).

CASING.**FIGURE 275.** (See Figure 500 A).

For Inserted Joint Casing, see Figure 500 E.

For Flush Joint Casing, see Figure 500 F.

CASING HEADS.

COMMON, WITH TWO GAS OUTLETS.

FIGURE 277.

COMMON, WITH FOUR GAS OUTLETS.

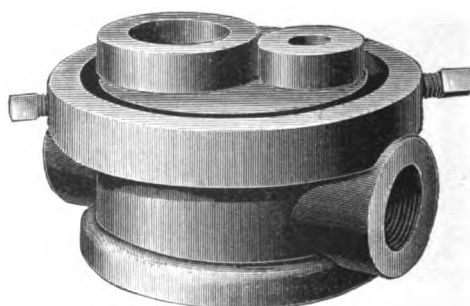
FIGURE 277 A.

TO SCREW ON TO THE CASING, AND TO HOLD UP THE TUBING.

TEE CASING HEAD.

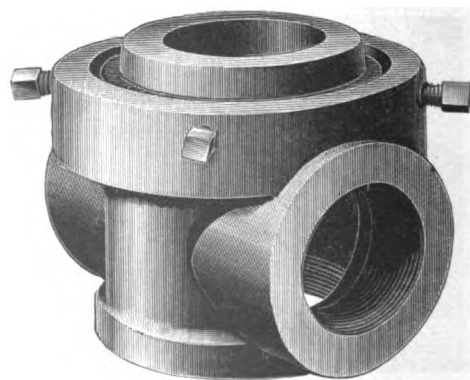
FIGURE 277 B.

COMMON WITH TWO HOLE CAP.

FIGURE 278.

The small hole is for Steam Pipe.

FOR LARGE TUBING.

FIGURE 278 A.

NORTHROP'S OIL SAVER.

FIGURE 279. (Formerly 280).

See next page for description.

CASING HEADS AND ELEVATORS.

COMMON CASING HEAD WITH NORTHRUP'S OIL SAVER.

FIGURE 280. (Formerly 279).



ARMOR CASING HEAD.

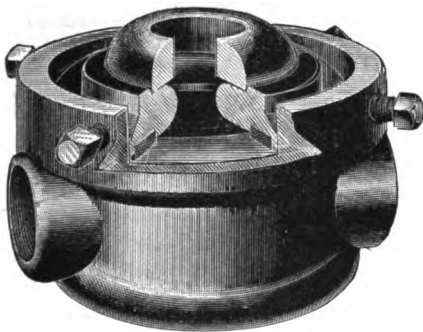
FIGURE 281.



To save the oil, when drilling in the oil sand and the well is flowing, or while tubing the well when it is flowing. The rubber disk encircles the cable or tubing tightly, and the oil runs through the pipes in the sides of the Casing Head and is conducted to the oil tank.

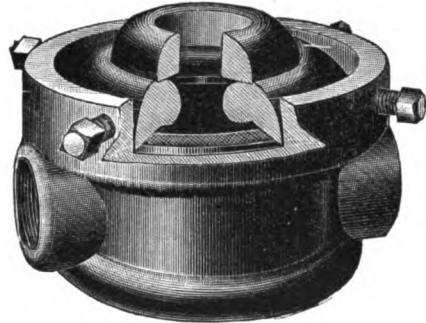
CHICKERING CASING HEAD.

FIGURE 281 A.



BERRY CASING HEAD.

FIGURE 281 B.

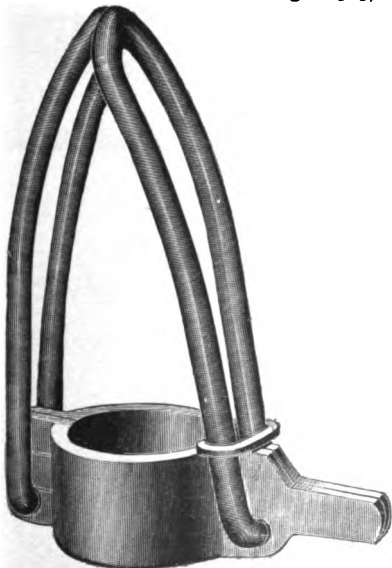


Made gas tight by a rubber packing ring.

CASING ELEVATORS.

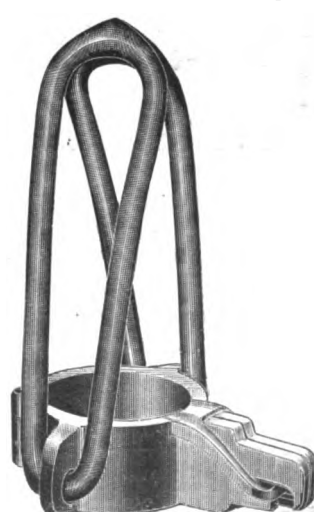
FISHER'S PATENT.

FIGURE 282. (Same as Figure 313).



FAIR'S PATENT.

FIGURE 282 A. (Same as Figure 314).

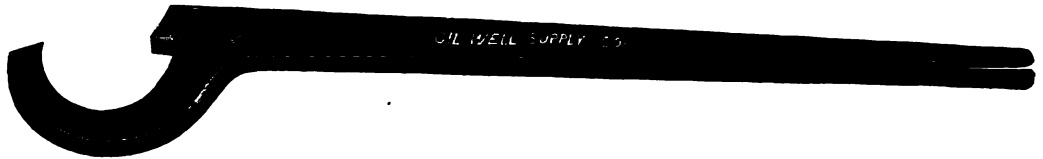


To elevate the Casing and to lower it into the well.

CASING TONGS.

COMMON.

FIGURES 283. (Same as Figure 745).



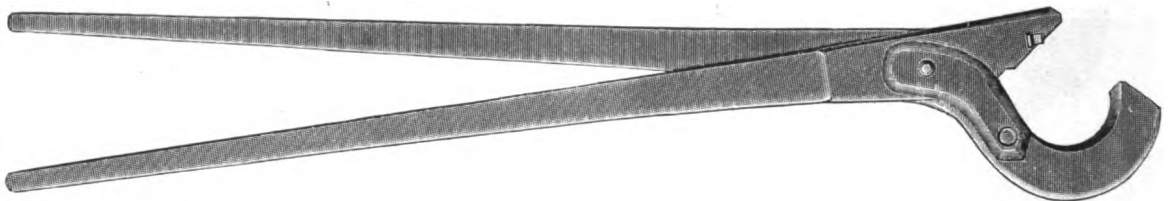
LAY'S PATENT.

FIGURE 284. (Same as Figures 315 and 747).



KLEIN'S PATENT, WITH SIDE RE-INFORCED.

FIGURE 284 A.



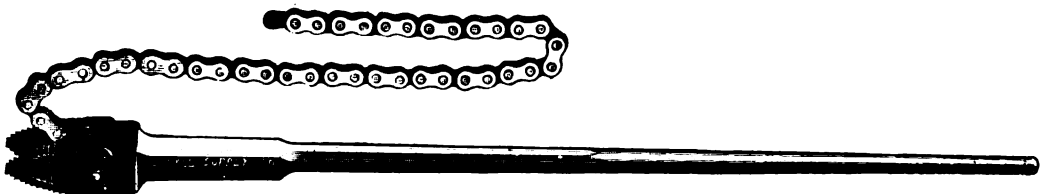
ROBBINS' PATENT, CHAIN.

FIGURE 285.



BROCK'S PATENT, CHAIN.

FIGURE 285 A.

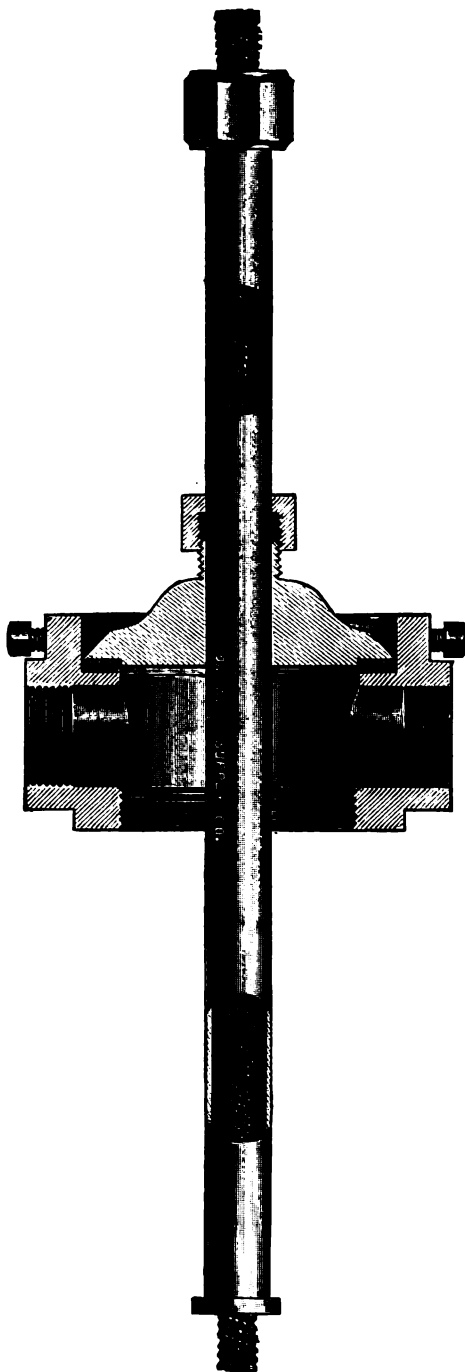


OIL SAVERS, &c.

BARREL OIL SAVER.

FIGURE 286.

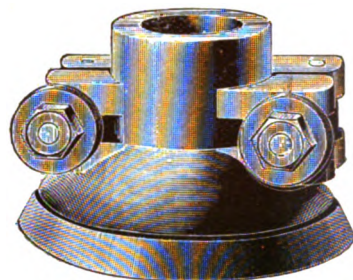
For drilling in the Oil Sand while the well is flowing. The drilling cable is put through the tube and packed in by rope yarn. The tube works up and down with the cable through a cap in the Casing Head. The Oil is carried off through the pipes in the sides of the Casing Head. The Cap is held on the Head by the set screws.



PATENTED.

CAP OIL SAVER.

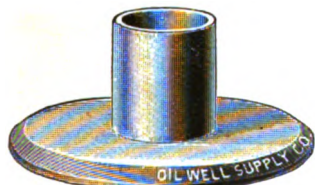
FIGURE 286 A.



Fastened in Casing Head. Cable works through it. Used when well is flowing before it is finished.

SAND LINE CAP.

FIGURE 287.



Set in the Casing Head. The sand pump line is put through it. Used while the well is flowing.

CASING TESTER.

FIGURE 288.



Put below the Casing and left a few hours, to test if the Casing is tight and that no water leaks through.

MEASURING LINES, &c.

CASING DISK.

FIGURE 289.



To be attached to the lowest joint of casing and when the casing is lowered in the Well, the water will buoy it up, sustaining a portion of the weight and saving much of the strain on the screw threads of the couplings. When the casing is in place, the disk is broken by dropping something of a few pounds weight into the casing.

CASING SWIVEL.

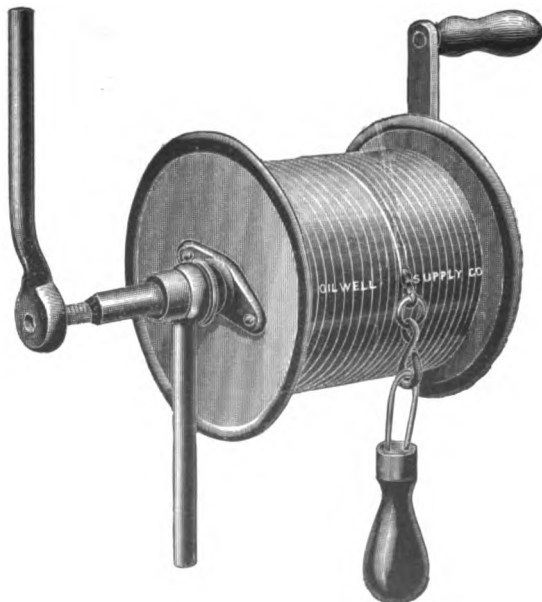
FIGURE 289 A.



Used in place of Elevators.

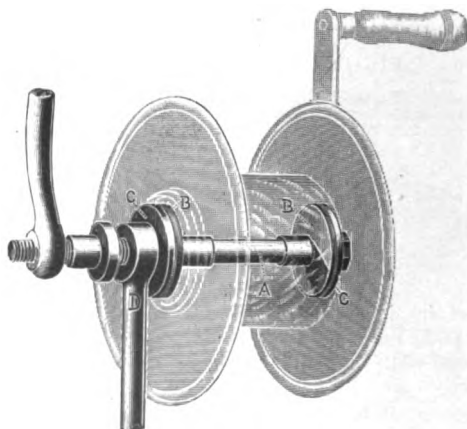
McCLURE'S PATENT MEASURING REEL.

FIGURE 290.



PATENT SELF OILING MEASURING REEL.

FIGURE 294.

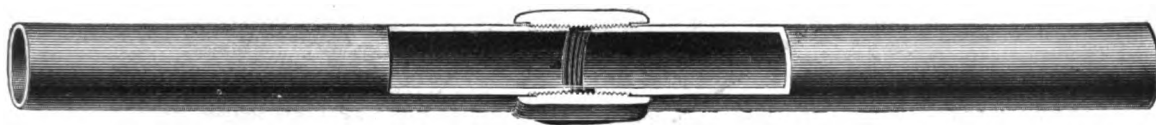


To measure the depth of a well. In using a steel wire measuring line, the weight must be attached by a short cord, so that the "jar" of the weight's striking the bottom can be more readily felt.

TUBING, &c.

TUBING WITH SLEEVE COUPLING.

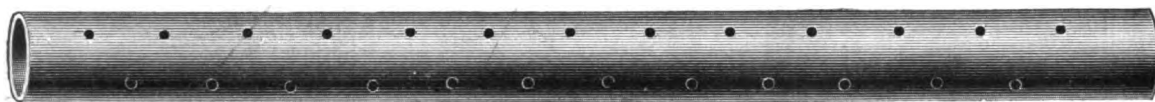
FIGURE 301. (See Figure 500 B).



All sizes from 1 inch to 6 inch inclusive.

PERFORATED PIPE OR ANCHOR.

FIGURE 305.



Used in the bottom of the well. See Figures 27 and 28.

MASSETH TUBING SUPPORTERS.

FIGURE 307.

FIGURE 307 A.

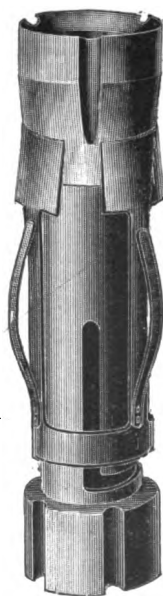


Figure 307 is put into the well about mid way between top and bottom.

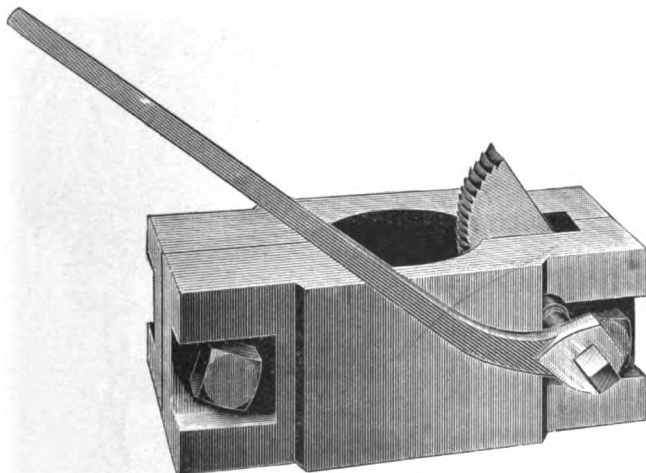
To prevent tubing from vibrating when in the well, and to take part of the weight of the tubing off the Casing Head.



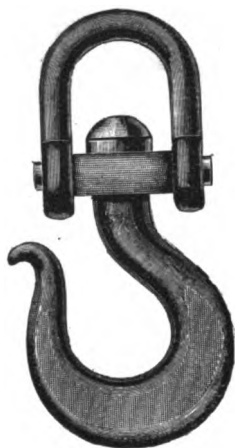
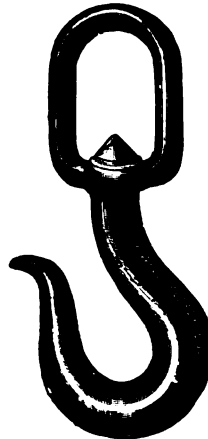
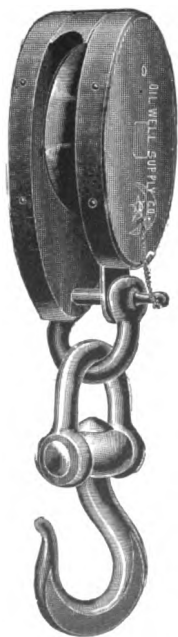
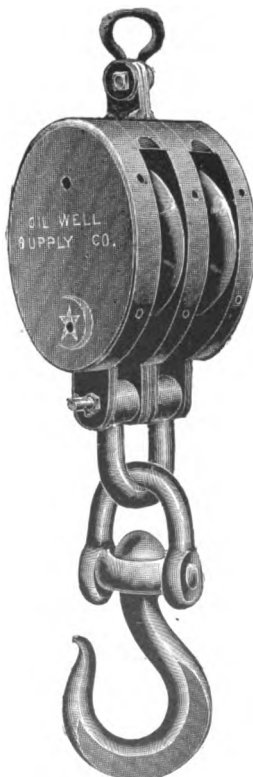
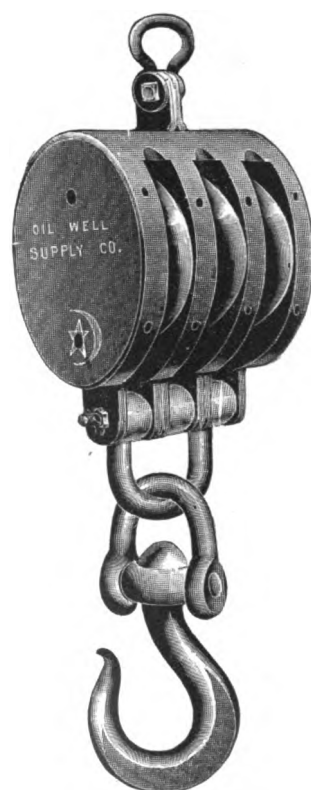
Figure 307 A is attached to the tubing, mid way, and rests in the top of 307.

TUBING CATCHER.

FIGURE 306.



To prevent tubing dropping while being put in the well.

HOOKS AND SNATCH BLOCKS.**TUBING HOOKS.****DOUBLE SWIVEL.****FIGURE 310.****SINGLE SWIVEL.****FIGURE 311.****SNATCH BLOCKS.****SINGLE.****FIGURE 312.****DOUBLE.****FIGURE 312 A.****TRIPLE.****FIGURE 312 C.**

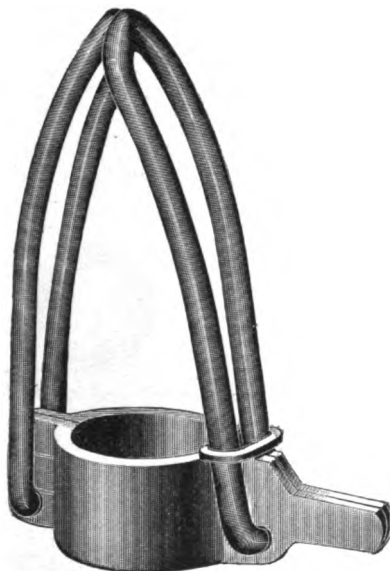
For hoisting and lowering Drive Pipe, Casing, Tubing, &c.

TUBING ELEVATORS AND TONGS.

TUBING ELEVATORS.

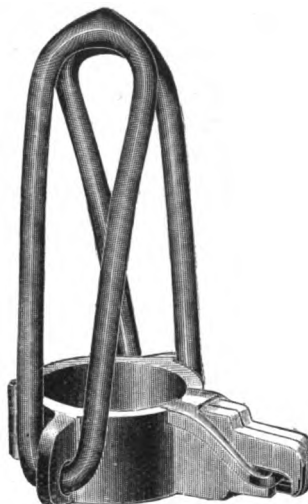
FISHER'S PATENT.

FIGURE 313. (Same as Figure 282).



FAIR'S PATENT.

FIGURE 314. (Same as Figure 282 A).

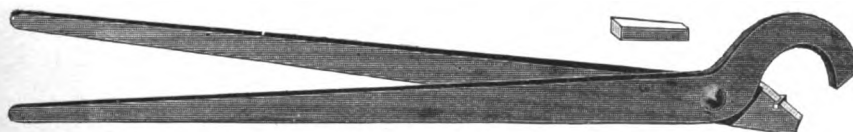


For hoisting and lowering tubing in the well.

TONGS.

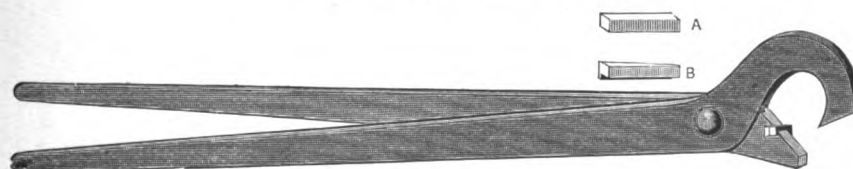
LAY'S PATENT.

FIGURE 315. (Same as Figures 284 and 747).



KLEIN'S PATENT.

FIGURE 315 C. (Same as Figure 757).



CRUMBIE'S PATENT.

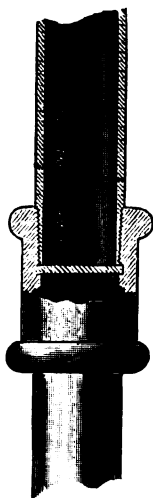
FIGURE 316. (Same as Figure 754 A).



TUBING AND SUCKER ROD APPLIANCES.

NEATH'S PATENT
TUBING DISC.

FIGURE 318.



To prevent a well from flowing while being tubed.

The disc is put in the tubing above the anchor, (see Fig. 28). When the operation of tubing is complete, the disc, which is of brittle metal, is broken by dropping a weight in the tubing and the well is then permitted to flow.

TUBING BAILER.

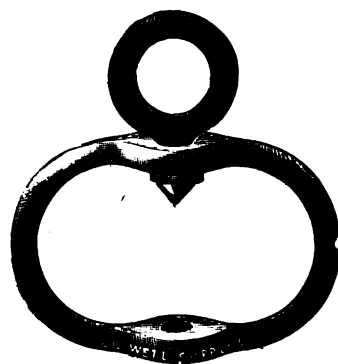
FIGURE 317.



To bail the water out of Tubing.

SUCKER ROD SWIVEL.

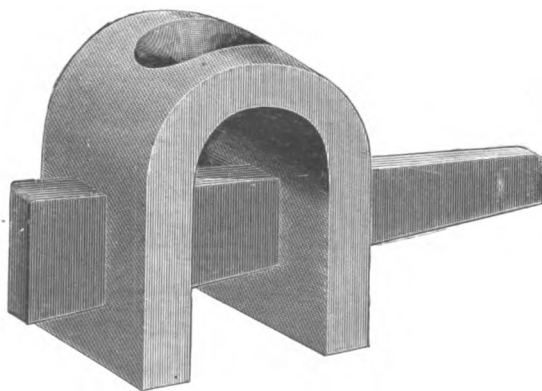
FIGURE 319.



Used in putting sucker rods in a well.

SUCKER ROD RIVETER.

FIGURE 319 A.



To fasten or tighten rivets in Sucker Rods.

SUCKER ROD JOINTS.

(See page 127 for sizes and details).

FOR 1 INCH WOODEN RODS.

FIGURE 321.



FOR 1½ INCH WOODEN RODS.

FIGURE 321 A.



FOR 2¼ INCH WOODEN RODS.

FIGURE 321 B.



FOR 3½ INCH WOODEN RODS.

FIGURE 321 C.



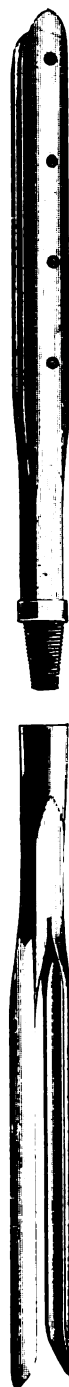
CANADIAN DRILLING POLE JOINTS.

FIGURE 321 D.



AUSTRIAN DRILLING POLE JOINT.

FIGURE 321 E.



SUCKER ROD PARTS.

SUCKER ROD STUB ENDS FOR WELDING.

7-16 INCH FOR 3-16 INCH SOLID ROD.

FIGURE 321 F.



3/8 INCH FOR 1/2 INCH HOLLOW ROD.

FIGURE 321 G.



1 1/8 INCH FOR 1 INCH SOLID ROD.

FIGURE 321 H.



1 3/8 INCH FOR 1 1/2 INCH HOLLOW RODS.

FIGURE 321 I.



1 1/2 INCH FOR 2 INCH HOLLOW ROD.

FIGURE 321 J.



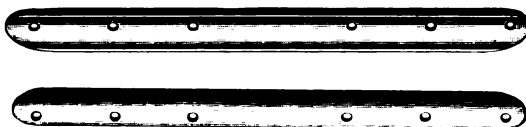
CANADIAN DRILLING POLE JOINT STUB ENDS.

FIGURE 321 K.



CANADIAN DRILLING POLE SPLICES.

FIGURE 321 L.



SUCKER (or Pump) ROD JOINTS, STUB ENDS, &c.

(See page 125).

SUCKER ROD JOINTS.

DRILL POLE JOINTS.

Number.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Size of Box and Pin....	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"	5"
" " Wood.....	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
No. of Rivet Holes....	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Size of Rivets.....	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
" " Square for Wrench	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
Length of Straps.....	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	25"	26"	27"	28"	29"	30"	31"	32"	33"	34"
Total Length of Joint...	36"	39"	42"	45"	48"	51"	54"	57"	60"	63"	66"	69"	72"	75"	78"	81"	84"	87"	90"	93"
Nominal Weight.....LBS.	2 1/4	5 1/2	6 1/2	7 1/2	8	8 1/2	12 1/2	10 1/2	24	26 1/2	30	15	15	21	21	21	22	22	26	26

Nos. 4 and 6 are Heavy.

STUB ENDS FOR WELDING.

(See page 126).

No.	Size.	Size of Rod.	Square for Wrench.	Length.	Weight.
1	1 1/4"	1 1/4" solid.	1 1/4"	12"	1 lb.
2	3/8"	3/4" hollow.	3/8"	10"	3 1/2 "
3	1"	1" "	1"	10"	4 1/2 "
4	1 1/8"	1 1/4" solid.	1 1/4"	11"	6 "
5	1 1/4"	1 1/4" hollow.	1 1/4"	11"	7 "
6	1 3/8"	1 1/2" "	1 3/8"	12"	8 "
7	1 1/2"	2" "	1 1/2"	12"	10 "
8	1 3/4"	2 1/2" "	2"	18"	25 "
9	Taper.	3/4" solid.	1"	10"	7 "
10	1" x 1 1/4"	1" "	1 1/4"	12"	8 "
11	1 1/4" x 1 3/4"	1 1/4" "	1 3/4"	12"	10 "

SUCKER ROD WRENCHES.

(See Figures 328-328 C, page 129).

Size of Wrench.	Size of Rods.	Square on Joint.	Weight.
1 1/4"	3/8" iron.	1 1/4"	2 lbs.
5/8"	1" wood.	5/8"	3 "
3/8"	1 1/2" "	3/8"	4 "
3/8"	1 3/4" "	3/8"	4 "
1"	1 7/8" "	1"	4 "
1"	2" "	1"	4 "
1 1/4"	2 1/4" "	1 1/4"	8 "
1 3/8"	2 1/4" " heavy.	1 3/8"	8 "
1 3/8"	2 3/4" "	1 3/8"	8 "
1 1/2"	3 1/2" "	1 1/2"	12 "
1 3/4"	3 1/2" " heavy.	1 3/4"	13 "

FOR PUMPING, &c.

SUCKER RODS.

FIG. 322.

WOODEN SUCKER ROD FOR 2 INCH TUBING.



FIG. 323.

WOODEN SUCKER ROD FOR LARGE TUBING.



FIG. 324.

ROUND IRON OR STEEL SUCKER ROD FOR SMALL TUBING.



FIG. 325.

TWISTED IRON SUCKER ROD FOR SMALL TUBING.



SUCKER ROD HOOK.

FIGURE 327.



SUCKER ROD TOOLS.

SUCKER ROD WRENCHES.

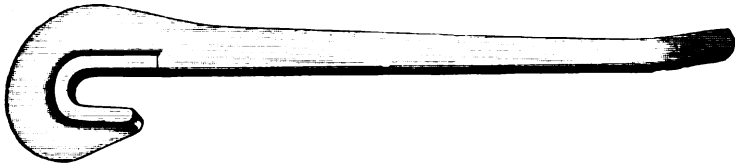
SMALL.
FIGURE 328.



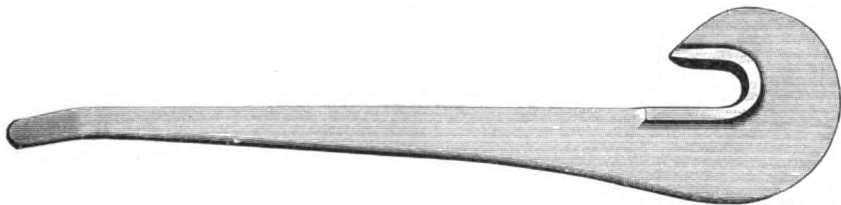
REGULAR.
FIGURE 328 A.



LARGE.
FIGURE 328 B.



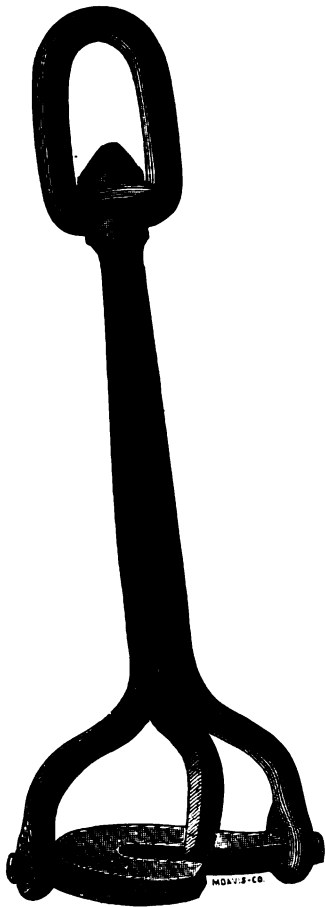
EXTRA LARGE.
FIGURE 328 C.



SUCKER ROD ELEVATORS.

FIGURE 329.

COMMON.

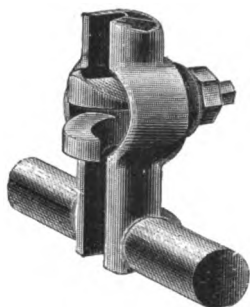


BAYONET ELEVATOR
WITH SLIDING TONGUE.
FIGURE 330.

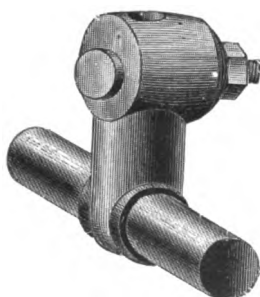


ADJUSTERS.

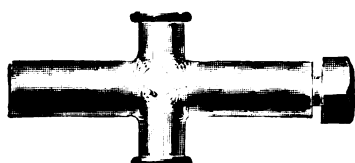
LEWIS' PATENT.
FIGURE 340.



LOCKE'S PATENT.
FIGURE 341.

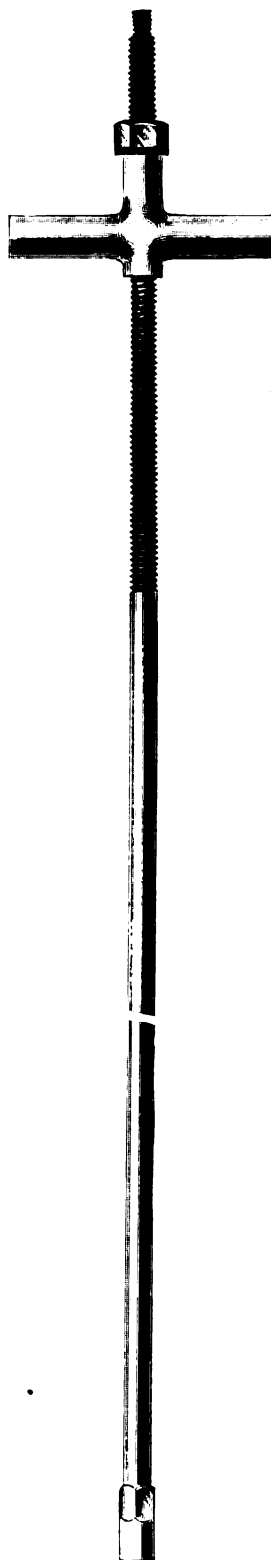


LITTLE GIANT.
FIGURE 342.



WITH SCREW ON
POLISHED ROD.

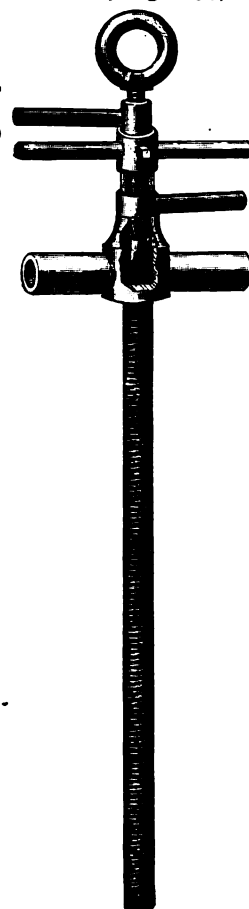
FIGURE 343.



DOWNING'S PATENT.

FIGURE 343 A.

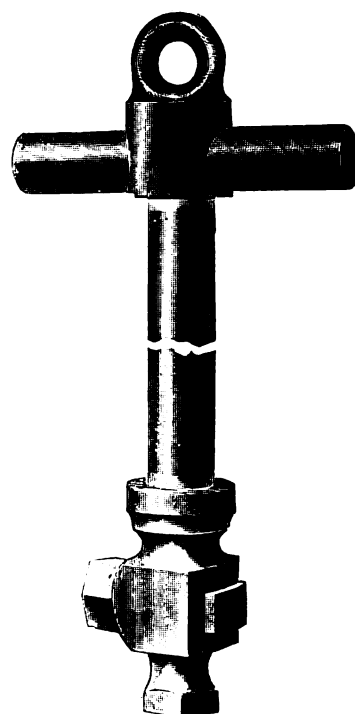
(Formerly Figure 349).



This gives a perfect adjustment and the string of rods can be turned to free the tubing of paraffine.

DICK'S GRIP.

FIGURE 343 B.



The connection between the grip and the journal is made of 2 inch tubing, allowing the connection on the polished rod to be made within the reach of the workman.

FOR PUMPING.

(See Figure 29, page 36).

POLISHED
ROD.
FIGURE 344.



To connect from the adjuster (page 130,) through the stuffing box (Figure 346,) to the upper end of the sucker rods.

VALVE ROD.
FIGURE 347.



To connect the lower end of the sucker rods to the working valve, (page 134).

ADJUSTER BOARD.

FIGURE 345.



To hold the adjuster on the walking beam.

STUFFING BOX.

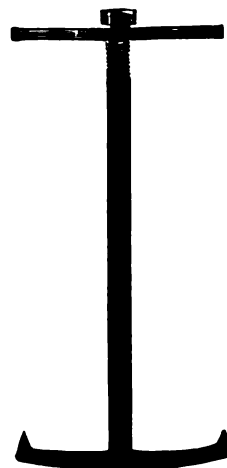
FIGURE 346.



Fits on the top of the tubing and around the Polished Rod, Figure 344.

ADJUSTER TEE BOLT.

FIGURE 348.



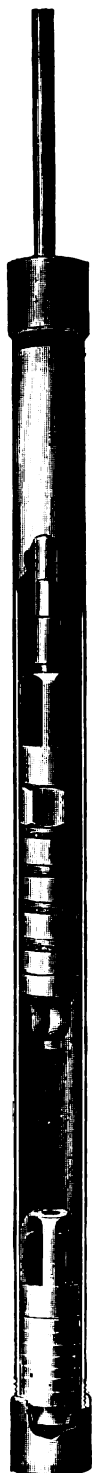
To fasten the adjuster board (Figure 345,) to the beam.

WORKING BARRELS AND PUMPS.

COMMON
WORKING
BARREL.
FIGURE 360.



SECTION OF
COMMON, SHOW-
ING VALVES.
FIGURE 361.



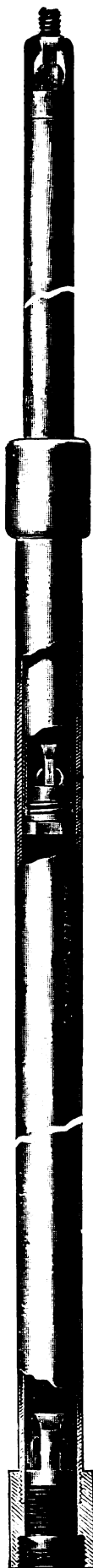
SNOW'S PATENT
WORKING
BARREL.
FIGURE 362.



SECTION OF
SNOW'S
WORKING
BARREL.
FIGURE 363.



PLUNGER WORKING BARREL.—FIGURE 364.



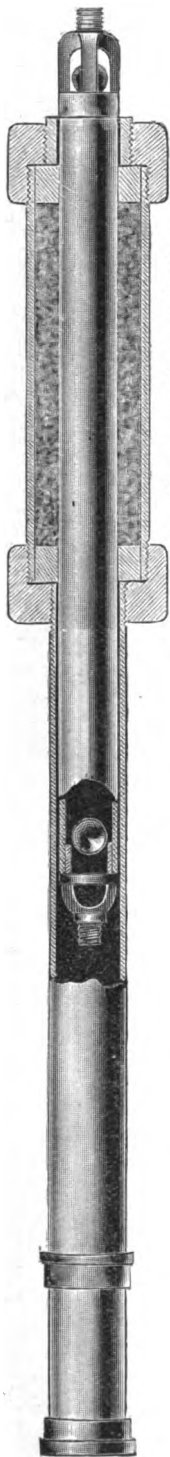
Brass or Cast Iron, furnished either with
or without Valves.

With Valves, Complete.

WORKING BARRELS AND PUMPS.

FIGURE 365.

PERKINS & AGGERS PLUNGER WORKING BARREL.



Plunger works through Hemp Packing.

FIGURE 366.

Corrugated Plunger.

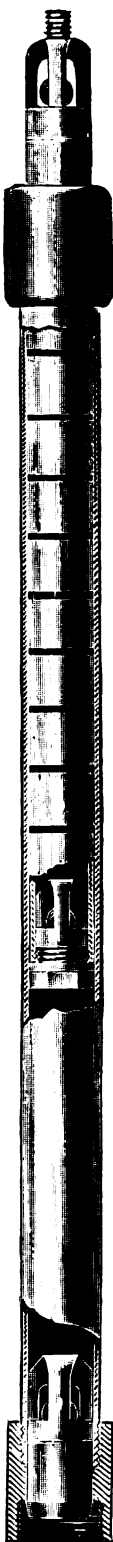


FIGURE 367.

Bird's Patent Corrugated Plunger, with rubber ring at each end.

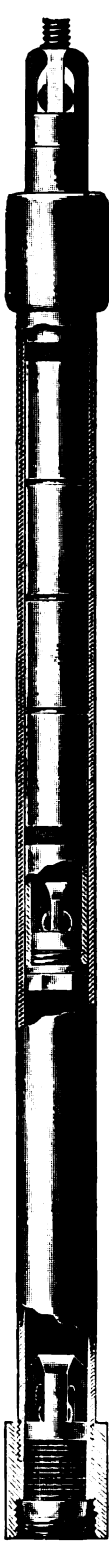


FIGURE 368.

DOWNING PUMP.



DARLING'S PATENT PUMP.

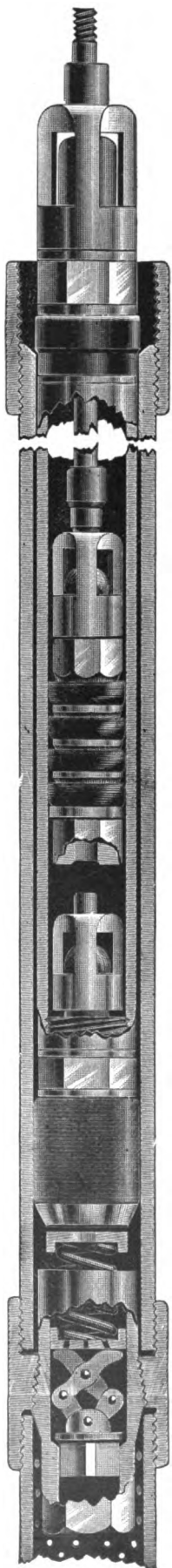


FIGURE 369.

Has a trap valve which automatically closes when the standing valve is removed (and opens when it is inserted,) preventing the flowing of water and air from the tubing back to the oil rock.

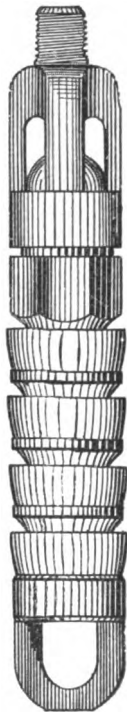
Plunger Barrels will wear much longer when there is sand in the well, as there is no leather to cut out.

VALVES FOR WORKING BARRELS.

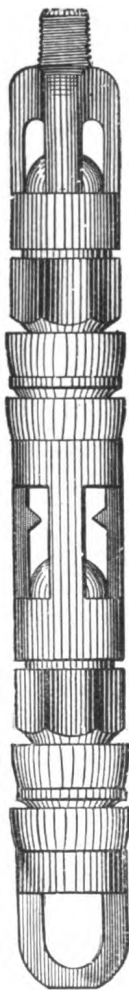
The upper valve is also called the "working" or the "pumping valve."

The lower valve is sometimes called the "standing valve."

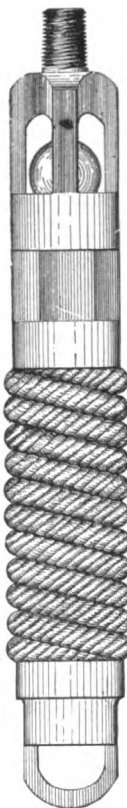
COMMON
UPPER VALVE
FIGURE 375.



DOUBLE BALL UPPER VALVE.—FIGURE 376.



ROPE
WORKING VALVE.
FIGURE 377.



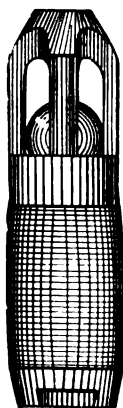
LANDAS ROPE
WORKING VALVE.
FIGURE 377 A.



Special directions with each valve.

See next page for Figure 378.

COMMON
LOWER VALVE.
FIGURE 379.



ONE CUP
LOWER VALVE.
FIGURE 379 A.



TWO CUP
LOWER VALVE.
FIGURE 379 B.



VALVES AND PARTS FOR WORKING BARRELS.

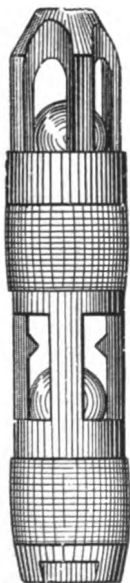
LEWIS PATENT
WORKING VALVE.

FIGURE 378.



DOUBLE BALL
LOWER VALVE.

FIGURE 380.



STEEL SEAT FOR VALVES.

FIGURE 381.



BOTTOM FOR LEWIS
VALVE WITH
STRAINER OFF.

FIGURE 382.



RUBBER VALVE CUP.

FIGURE 383 A.



BOW SPRING VALVE CUP.

FIGURE 383 C.



RIVET CATCHER.

FIGURE 384.



To put on the upper end of the valve rod (Figure 347,) to catch any rivets that may work out of the sucker rods and prevent their dropping into the working barrel.

REVERSIBLE STEEL SEAT
FOR VALVES.

FIGURE 381 A.



LEATHER VALVE CUP.

FIGURE 383.



HORN VALVE CUP.

FIGURE 383 B.



METALLIC VALVE CUP.

FIGURE 383 D.



VALVE BALL.

FIGURE 385.



VALVES FOR WORKING BARRELS.

KINNEY GAS VALVE.

FIGURE 386.



FLEMING SAND VALVE.

FIGURE 390.



This is a standing or lower valve, and has a pocket for sand to settle in.

CROCKER CHECK VALVE
WITH ROD.

FIGURE 387.

STEEL SEAT FOR
CROCKER CHECK.

FIGURE 391.

CROCKER CHECK VALVE,
SEATED IN
WORKING BARREL.

FIGURE 388.

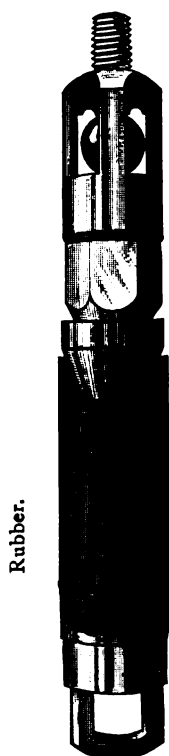


To hold up the column of fluid and prevent its pounding down on the valve when the working barrel is filled, partly with oil and partly with gas.

VALVES FOR WORKING BARRELS.

HUGHES UPPER
VALVE.

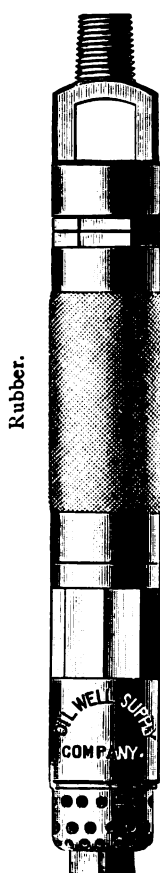
FIGURE 392.



The rubber packing is dis-
tended by the cone.

ERIE UPPER VALVE.

FIGURE 393.



The ball is in the lower
part and the weight of the
fluid presses on the inside of
the rubber sleeve, forcing it
out against the sides of the
working barrel.

O'NEIL UPPER VALVE.

FIGURE 394.



O'NEIL LOWER VALVE.

FIGURE 394 A.



In this valve the ball is
dispensed with and oblong
plates faced with leather are
held by a weak spring over a
number of fine perforations.
In the operation of pumping
the force of the fluid lifts the
plates. The pounding of the
ball is obviated, and much
sand is strained out.

PACKERS.

SPETTIGUE'S PATENT.

FOR PACKING THE BOTTOM OF THE TUBING.

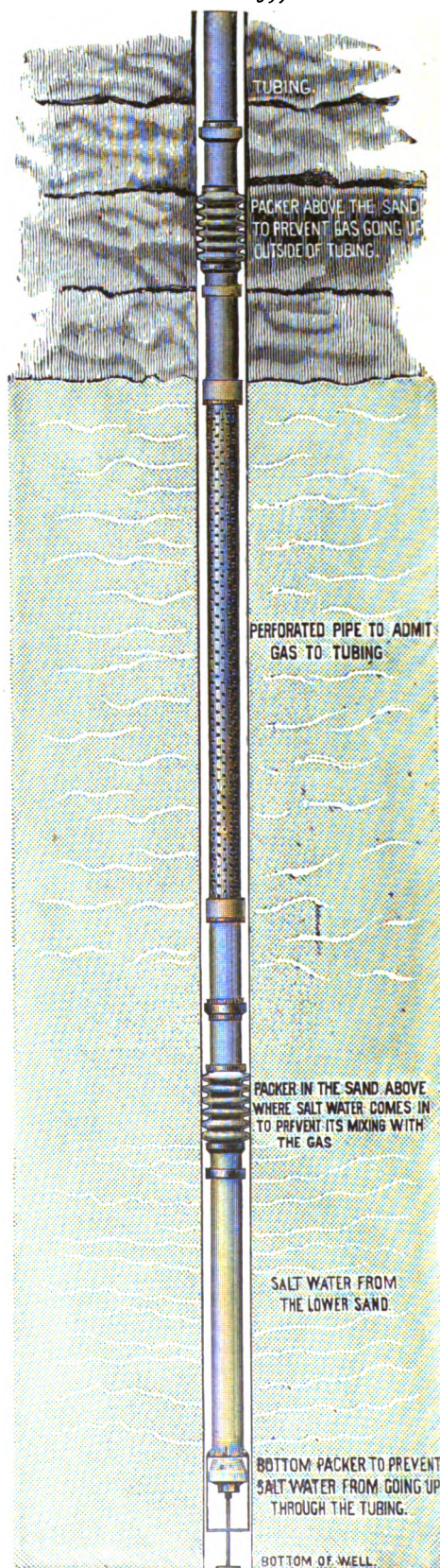
FIGURE 398.



The cone is drawn out and fastened by some easily broken fastening, the packer is attached to the tubing and lowered into the well. When the disc touches the bottom, the fastening is fractured and the weight of the tubing drops upon the cone, hermetically plugging it and preventing all ingress of salt water.

To be used where the well produces salt water below, or in the lower part of the gas veins.

FIGURE 399.

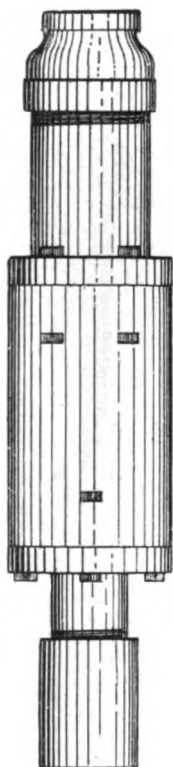


PACKERS.

EATON PACKERS.

HOADLY PACKER.

FIGURE 400.



SHORT RUBBER. LONG RUBBER.

FIGURE 401.

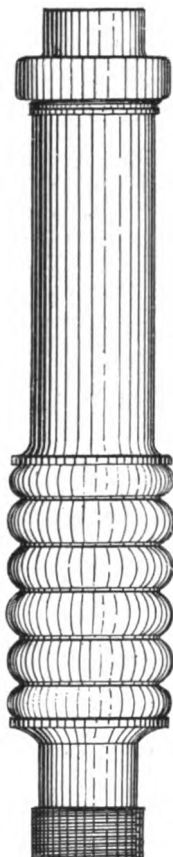
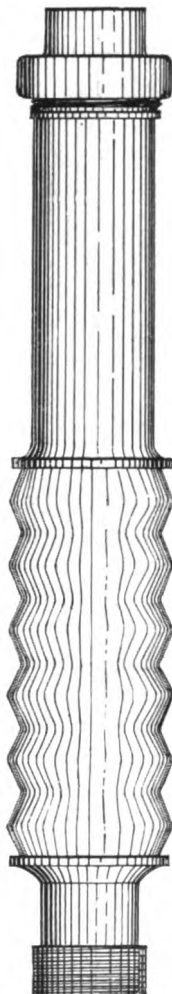


FIGURE 402.



ARMOR PACKER.

FIGURE 403.



TUBING PACKER.

FIGURE 404.



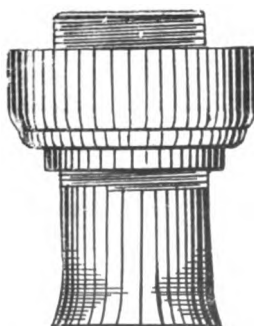
CUP PACKER WITH
SMALL PIPE.

FIGURE 405 A.



HEINZ CUP PACKER.

FIGURE 405.

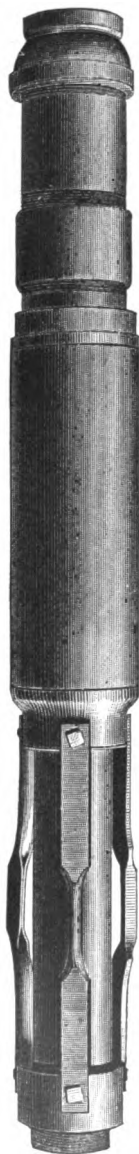


PACKER AND ANCHORS.

(The pressure of the gas will blow the tubing out of the well, unless it is anchored).

BROODER'S GAS PACKER.

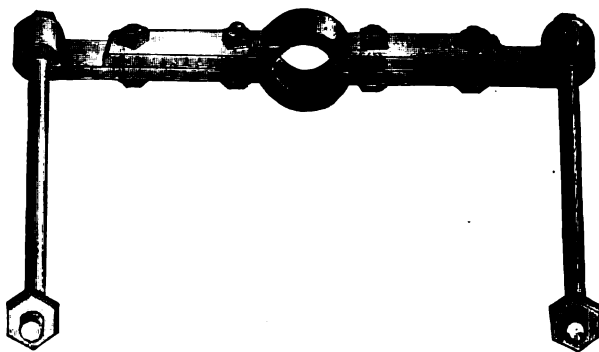
FIGURE 406.



Does not require any pipe below it. To expand the rubber the Tubing is turned to the left.

GAS PACKER ANCHOR.

FIGURE 407.

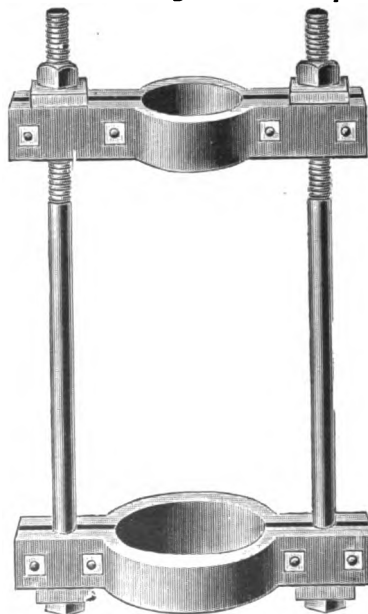


To fasten tubing to derrick sills. To hold down tubing or casing when well is packed with a Gas Packer.

GAS PACKER ANCHOR.

FIGURE 407 A.

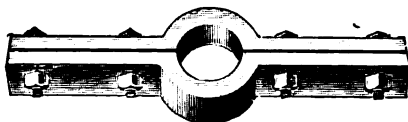
To anchor tubing to the Drive Pipe.



The large ring is put under Drive Pipe or large Casing Coupling, and the small ring above a tubing, or small casing, coupling.

GAS PACKER CLAMP.

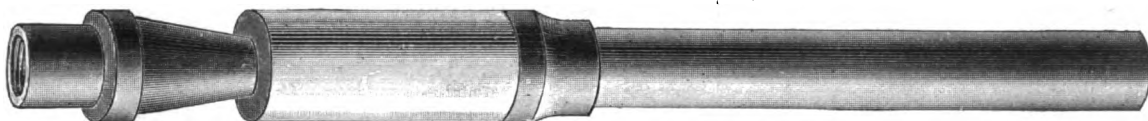
FIGURE 407 B.



PACKERS.

MACKSBURG PACKER.

FIGURE 408.



DRESSER'S CAP PACKERS.

FIGURE 409.



FIGURE 409 A.

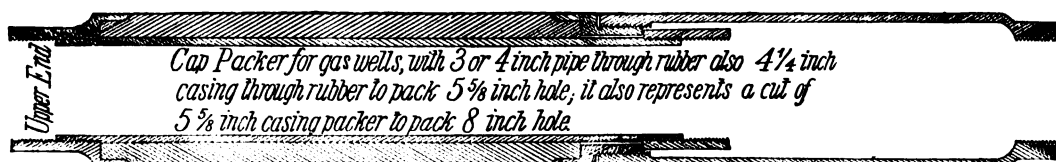
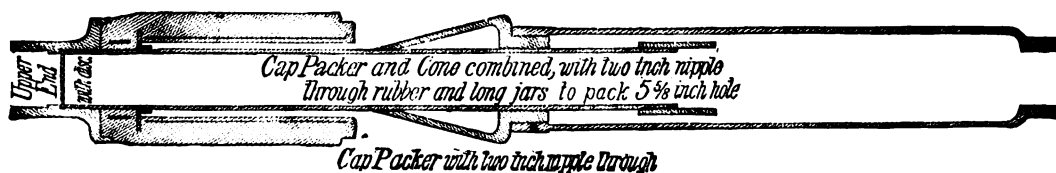


FIGURE 409 B.

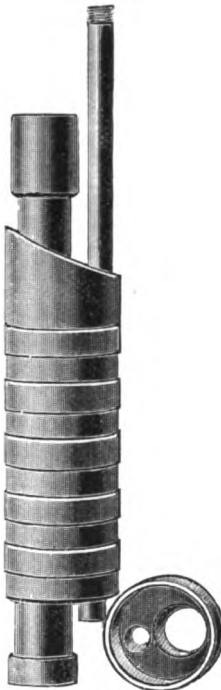


PACKERS.

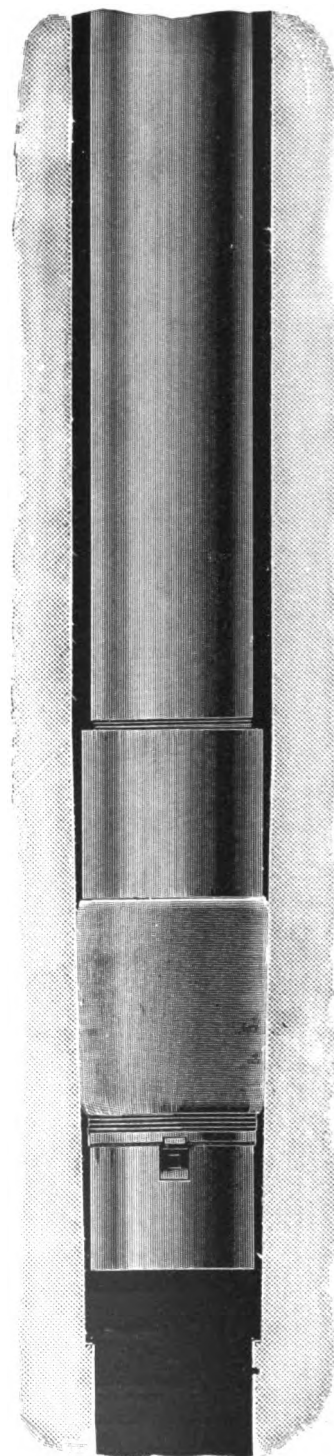
HOADLEY'S CUP PACKER.

WALL PACKER.
FIGURE 409 C.

Does not require any pipe below it.
To expand the rubber the Tubing is
turned to the left, and the flanges are
drawn together by a left handed screw.

PUMPING PACKER,
FIGURE 409 D.

Packed by the weight of the tubing.
The small pipe is for a gas escape.

HOWE'S PATENT
CASING PACKER.
FIGURE 409 E.

Rubber.

Packs in a tapered hole.

PACKERS.

MASSETH'S PATENT CASING PACKERS.

FOR OIL, GAS OR WATER.

FIGURE 409 F.



Packs by the weight of the Casing.

FIGURE 409 G



Packs by pulling the Casing up.

CAVE PACKER.

FIGURE 409 H.



Packs by downward pressure.

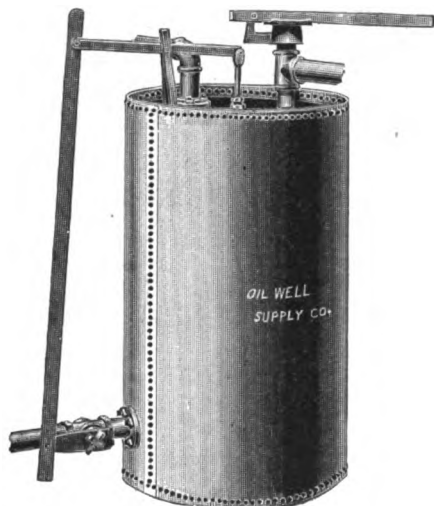
When a drilling well passing through a caving rock this Packer is placed below the Cave, enough Casing is left on top of the packer to reach above the Cave. Drilling is continued through the Packer.

TANKS.

IRON GAS TANKS.

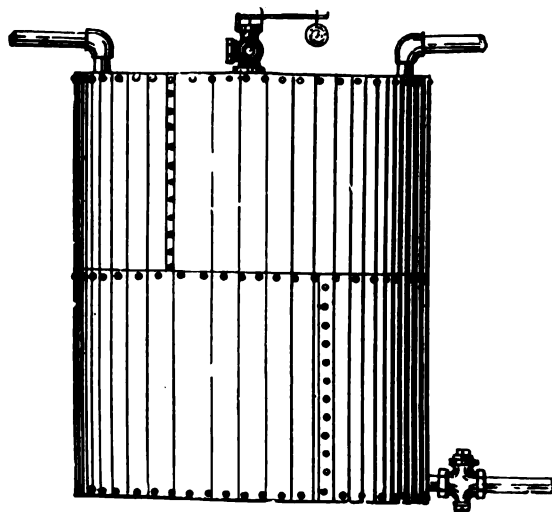
WILBUR'S PATENT.

FIGURE 410 A.



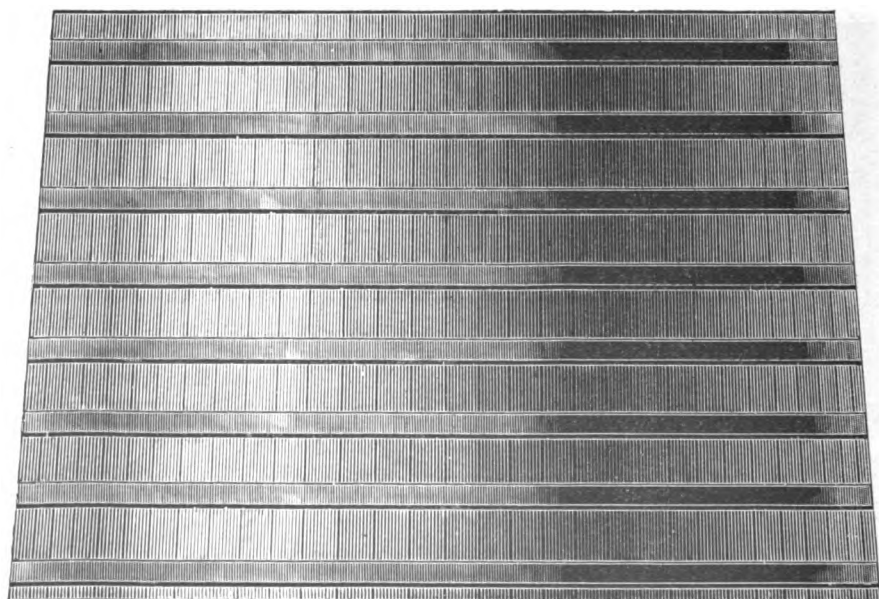
COMMON.

FIGURE 411.



WOODEN TANK.

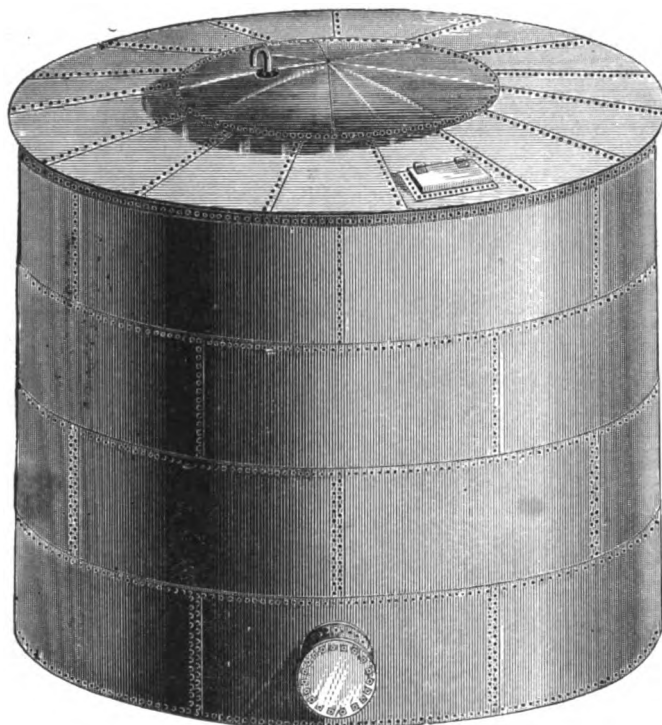
FIGURE 412.



Any size from 20 barrels to 1,200 barrels Capacity.

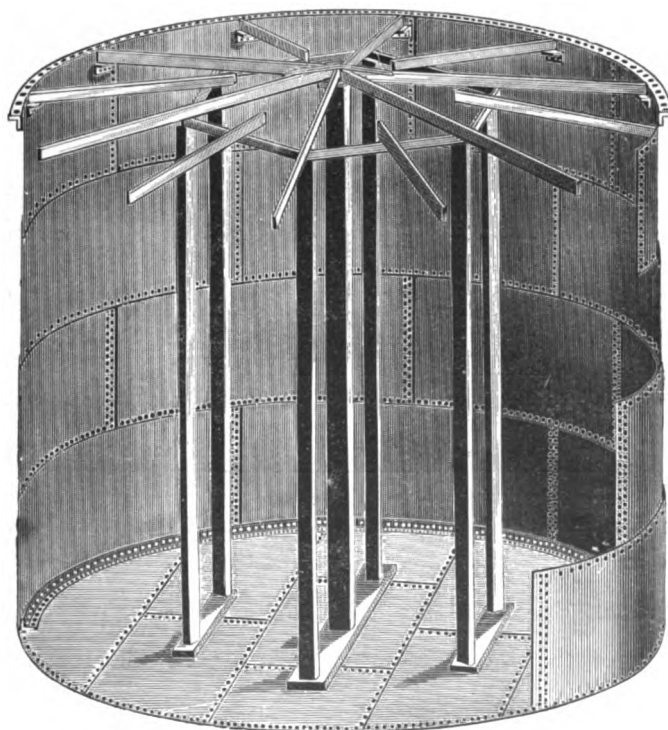
IRON TANKS.

FIGURE 412 A.



SECTION.

FIGURE 412 B.



See next page for Specifications.

SPECIFICATIONS OF IRON TANKS,

Ranging from 25 bbls. to 35,000 bbls. capacity, to hold either Crude or Refined Petroleum.

If tanks are required for water or liquids heavier than Petroleum, heavier iron should be used.

SPECIFICATIONS OF OIL STORAGE TANKS.

Capacity, (Bbls. of 42 Gals. each) about.	25	50	75	100	150	200	250	800	850	400	500
Diameter.....in feet	6	8	9	9	9	14	14	14	14	18	18
Height....."	5	6	7	9	14	8	10	12	14	9½	12
No. of Rings in Shell.....	1	2	2	2	3	2	2	3	3	2	3
Thickness of 1st Ring (B.W.G.).....	No. 8	No. 8	No. 8	No. 8	No. 7	No. 7	No. 7	No. 7	No. 7	No. 7	No. 6
" " 2nd ".....	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 7
" " 3d ".....	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8
" " Bottom.....	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 8	" 7	" 7	" 7
Size of Bottom Angle Iron.....in inches	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2½x2½x½	2½x2½x½
" Top.....	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½
Thickness of Sheets for Tight Riveted Roof	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12

Tanks are provided with a Man-hole on first ring, also an Outlet Flange, and Tanks with roofs are provided with an additional Man-hole on top, as shown by "Fig. 412A," page 145.

"Fig. 412 B," page 145 shows manner of supporting roofs with wood work.

Tanks can also be furnished with self-supporting iron roof rafters.

These tanks will meet the requirements of cheap and durable tanks for storage purposes.

Tanks from 25 bbls. to 150 bbls. capacity, are riveted up at works, and can be shipped complete over most railroads.

SPECIFICATIONS OF OIL STORAGE TANKS.

Capacity (Bbls of 42 gals. each) about	1000	2000	3000	4000	5000	10000	15000	20000	25000	30000	35000
Diameter.....feet	30	30	30	35	43	54	66	78	86	86	92
Height....."	8	16	24	24	20	25	25	25	25	30	30
No. of Rings in Shell.....	2	4	5	5	4	6	6	6	6	7	7
Thickness of 1st Ring (B.W.G.).....	No. 7	No. 5	No. 3	No. 3	No. 3	No. 3	No. 3	No. 2	No. 1	No. 0	No. 00
" " 2nd ".....	" 8	" 6	" 4	" 4	" 4	" 3	" 3	" 3	" 2	" 1	" 0
" " 3rd ".....	" 8	" 7	" 5	" 5	" 5	" 4	" 4	" 4	" 3	" 2	" 1
" " 4th ".....	" 8	" 8	" 6	" 6	" 6	" 5	" 5	" 5	" 4	" 3	" 2
" " 5th ".....	" 8	" 8	" 7	" 7	" 7	" 6	" 6	" 6	" 5	" 4	" 3
" " 6th ".....	" 8	" 8	" 7	" 7	" 7	" 7	" 7	" 7	" 6	" 5	" 4
" " 7th ".....	" 8	" 8	" 7	" 7	" 7	" 7	" 7	" 7	" 6	" 5	" 4
" " Bottom Plates.....	" 7	" 7	" 7	" 7	" 7	" 7	" 6	" 6	" 6	" 6	" 6
" " Sketch ".....	" 7	" 7	" 7	" 7	" 7	" 7	" 6	" 6	" 6	" 6	" 5
Size of Bottom Angle Iron, inch	2½x2½x½	2½x2½x½	2½x2½x½	2½x2½x½	2½x2½x½	2½x2½x½	3x3x½	3x3x½	3x3x½	4x4x½	4x4x½
" Top Angle Iron.....	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½	2x2x½
Thickness of Sheets for Light Nailed Roof.....	No. 20	No. 20	No. 20	No. 20	No. 20	" 20	" 20	No. 20	No. 20	No. 20	No. 20
Thickness of Sheets for Tight Riveted Roof.....	" 12	" 12	" 12	" 12	" 12	" 12	" 12	" 12	" 12	" 12	" 12

Tanks are provided with a Man-hole on first ring, also an Outlet Flange, and Tanks with roofs are provided with an additional Man-hole on roof.

The above are "Standard" Specifications of Iron Tanks for storage purposes.

In rating the capacity of Tanks, an allowance is made for the "deadwood" or timbers supporting the roofs.

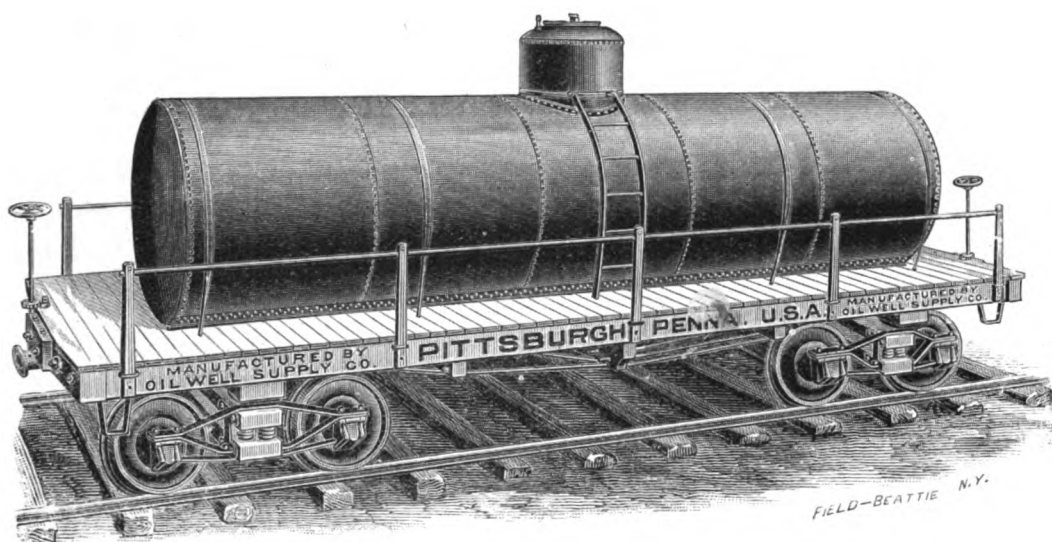
We furnish plans, specifications and estimates on Iron or Steel Tanks, of any size or style, for any purpose.

Any information in regard to this class of work will be cheerfully furnished.

TANK CAR, CONNECTIONS, &c.

TANK CAR.

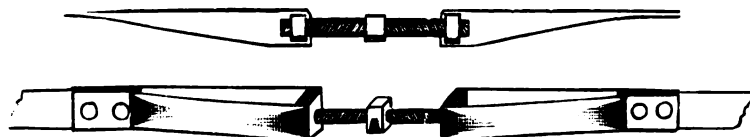
FIGURE 412 C.



Tank holds about 100 barrels of 42 gallons. Cars are built to suit any Rail Road track gauge.

WARE'S PATENT WOODEN TANK HOOP CONNECTIONS.

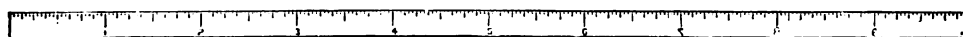
FIGURE 413.



To tighten the hoops of wooden tanks.

GAUGE ROD.

FIGURE 414.



To measure oil in tanks.

WOODEN CONNECTING RODS.

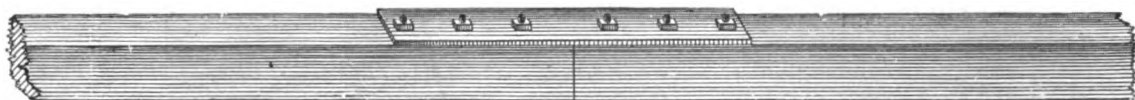
SMALL SIZE $1\frac{1}{4} \times 2\frac{1}{2}$ INCHES.

FIGURE 415.



LARGE SIZE 2×3 INCHES.

FIGURE 416.

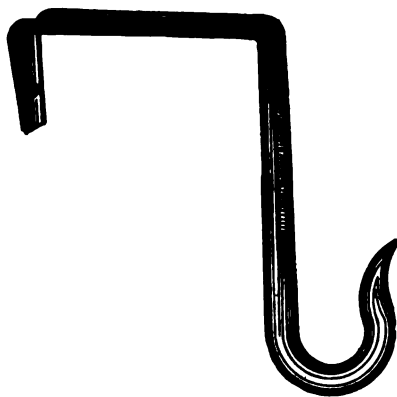


ANY OTHER SIZES MADE TO ORDER.

These rods are used to connect several wells, so that they can all be pumped by one engine. A hundred different wells may be thus coupled together, even though thousands of feet apart. The manner of making connections is shown in Figure 443. The rods are of ash, from 20 to 25 feet long, and are united by fish plates (Figures 473 and 474), fastened to the rods by bolts and nuts.

WATER WELL HOOK.

FIGURE 418.



This fits over the walking beam, and the pump rod of the water well hangs on the hook. (See Figure 14, page 19).

TUBING STAY.

ARNOLD'S.

FIGURE 420.

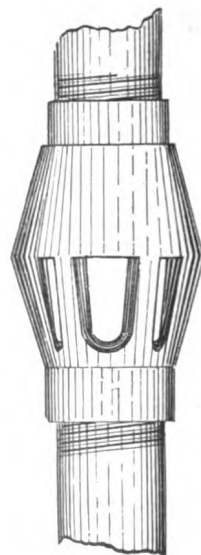


Fits around tubing and centres it in the well.

WELL FLOWER.

INNIS PATENT.

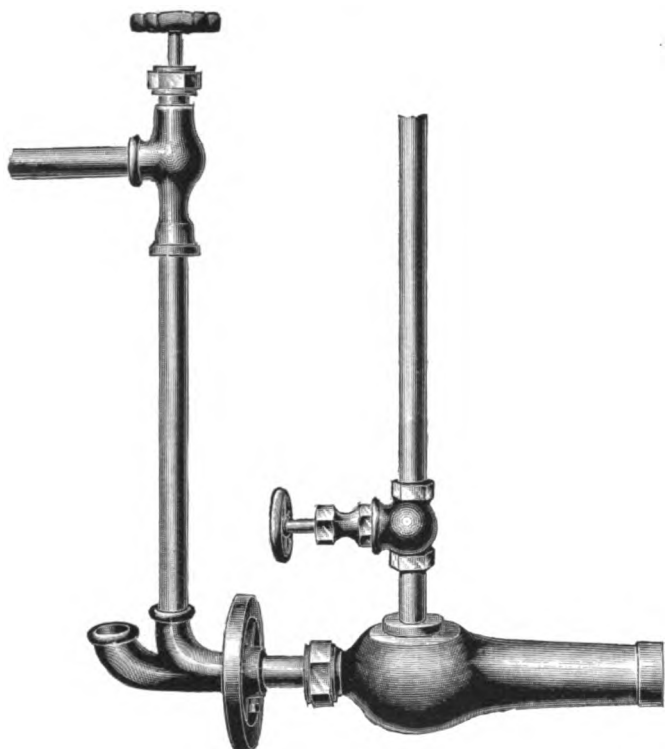
FIGURE 425.



Used on the tubing below the packer in flowing well instead of the perforated pipe or anchor shown in Figures 27, 28, 29 and 305.

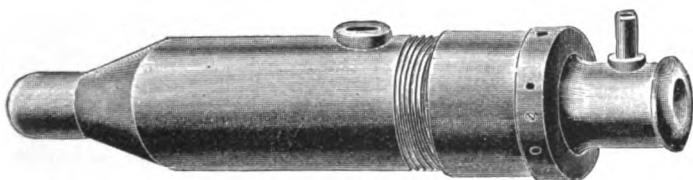
PARSON OIL BURNER.

FIGURE 426.



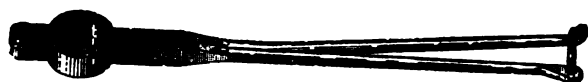
REED OIL BURNER.

FIGURE 426 A.



TUBING CLAMPS.

FIGURE 427.



PARAFFINE AUGER.

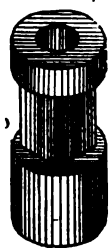
FIGURE 428.



SOFT OR FUSIBLE PLUGS FOR BOILERS.

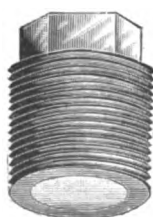
ELEVATOR OR
POLISHED ROD SUB.

FIGURE 429.



COMMON.

FIGURE 430.



PATENT.

FIGURE 430 A.



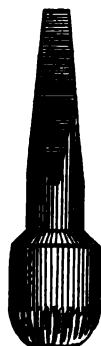
EXPLOSIVE.

FIGURE 430 B.



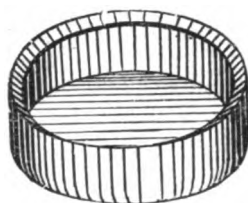
VALVE REAMER

FIGURE 431.



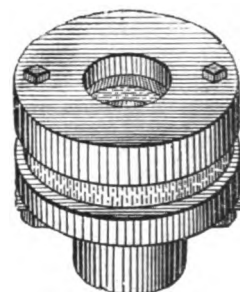
LEATHER CUP FOR CASING.

FIGURE 432



SUCKER ROD CLEANER.

FIGURE 433.



DRY HOLE PLUG, WOODEN.

FIGURE 434.



DRY HOLE PLUG, IRON.

FIGURE 434 A.

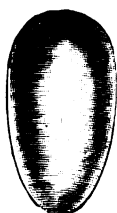
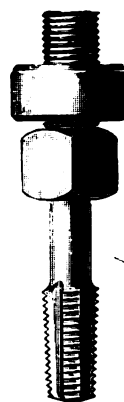
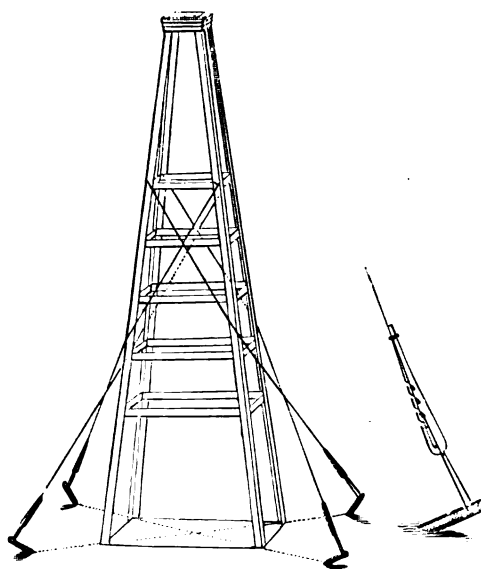
TAP FOR DRAWING
LOWER VALVE.

FIGURE 435.

**DERRICK STAYS.**

ANDERSON'S PATENT.

FIGURE 436.

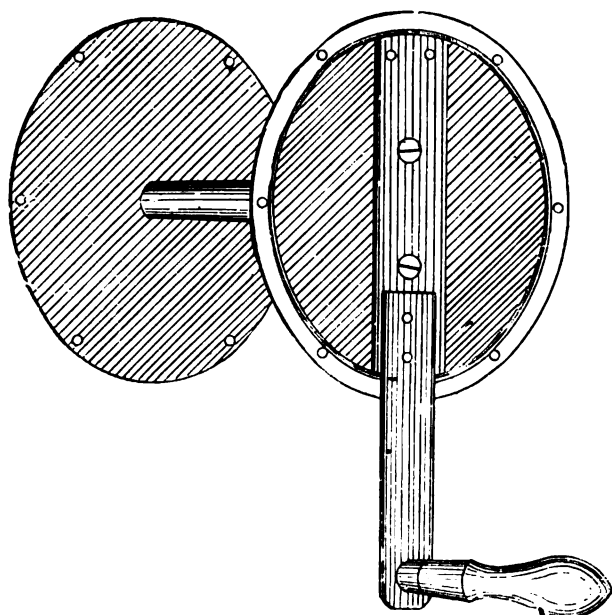


To prevent wind from over-turning the derrick; an inexpensive and effectual safe guard.

TORPEDO REELS.

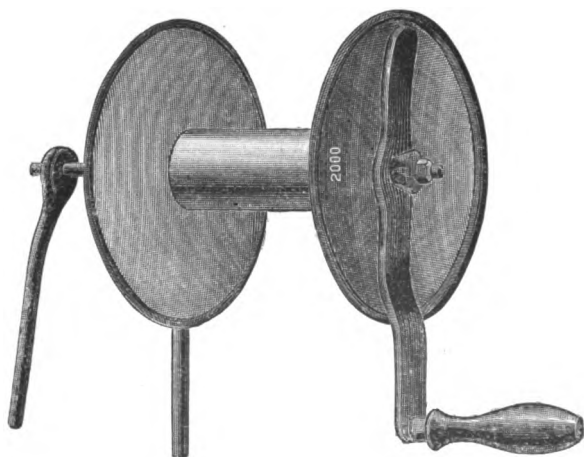
COMMON.

FIGURE 440.



McCLURE'S PATENT TORPEDO REEL,
WITH BRAKE ATTACHMENT.

FIGURE 441.



PUMPING OUTFITS, MICHIGAN PATTERN.

ADJUSTER,
POLISHED ROD, AND
CONNECTING
JOINT.

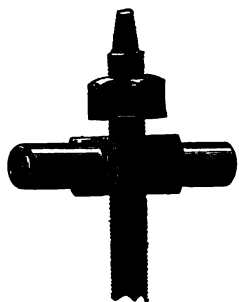


FIG. 442.

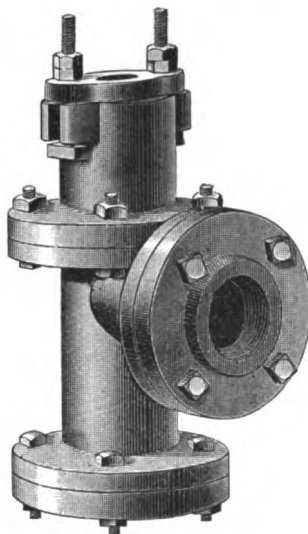


FIG. 442 A.



FIG. 442 B.

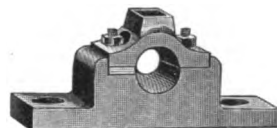
STUFFING BOX.
FIGURE 442 D.



SUBSTITUTE OR DUTCHMAN.
FIGURE 442 E.



ADJUSTER BOX.
FIGURE 442 C.



VALVE ROD.
FIGURE 442 F.

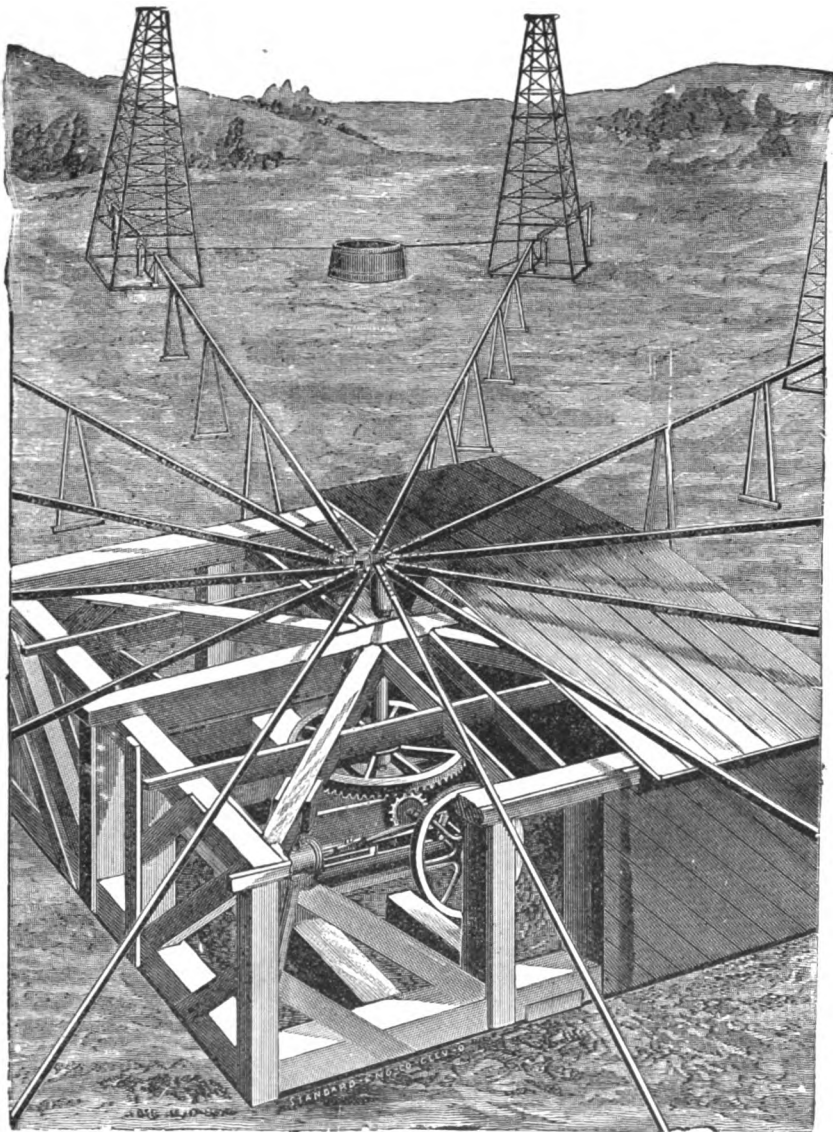


A Brass Working Barrel, set of Valves and a Casing Head are included in a complete outfit.

PUMPING RIG.

ALLEN'S PATENT.

FIGURE 443.

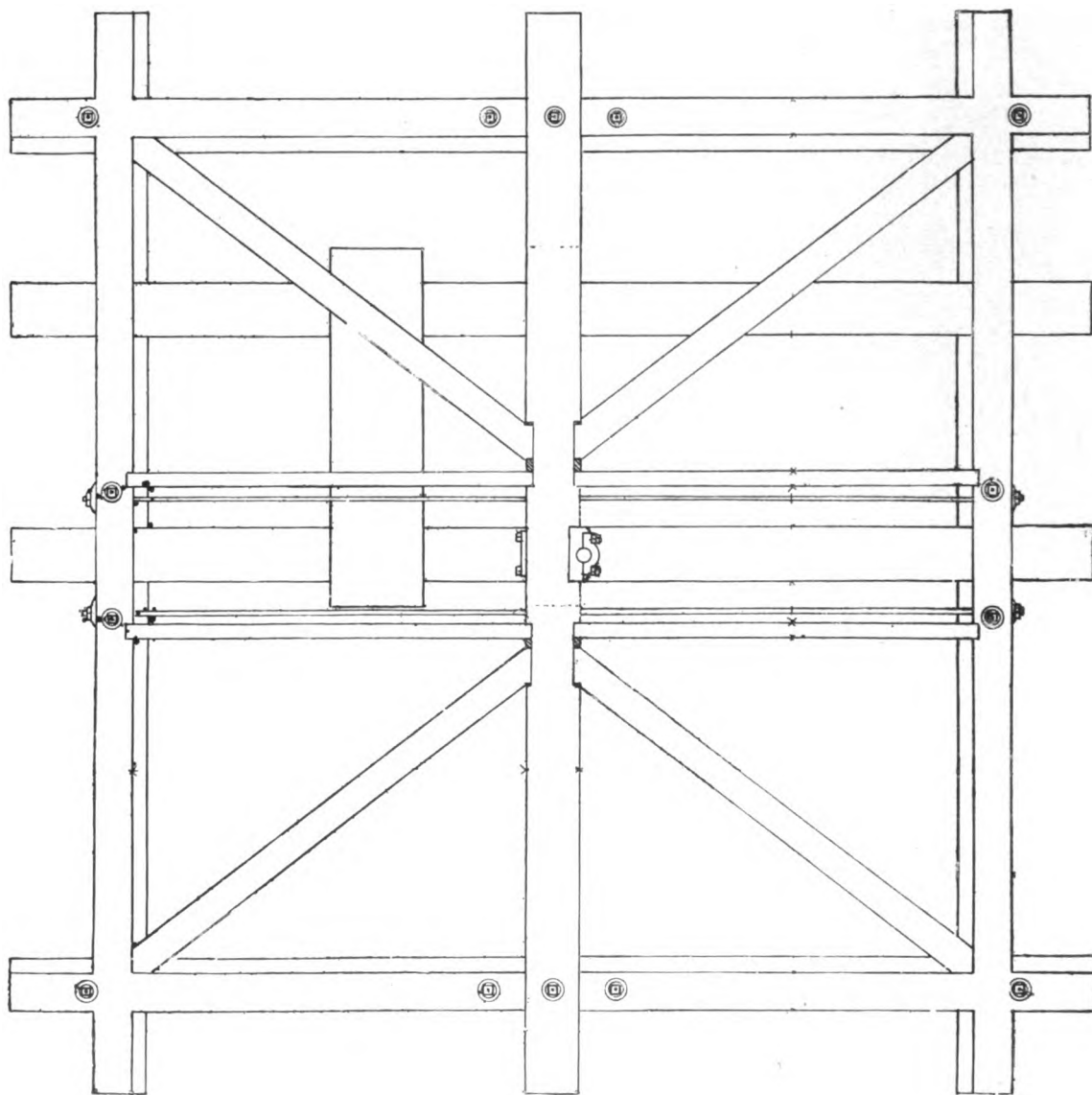


For pumping many wells with one engine. This device has been extensively used, and has given satisfaction. It is economically operated, and any part that becomes damaged is easily repaired. Any one can put it up and keep it in order.

ALLEN'S PUMPING RIG.

TOP VIEW OF FRAME.

FIGURE 443 A.



SPECIFICATION OF WHITE OAK TIMBER REQUIRED.

10 Pieces 14 inch x 14 inch by 24 feet for 3 Lower Sills, 4 Middle Sills, 2 Upper Sills and one Top Cross Beam.

- 4 " 8 " x 10 " " 24 " " 4 Plates.
- 1 " 24 " x 24 " " 8 " " Engine Block.
- 1 " 14 " x 24 " " 8 " " Upright Shaft Block.
- 4 " 10 " x 10 " " 7 " " Four Longest Posts.
- 8 " 10 " x 10 " " 6 " " Eight Shortest Posts
- 16 " 6 " x 6 " " 9 " " 16 Side Braces.
- 4 " 4 " x 8 " " 9 " " 4 Parallel Top Braces
- 4 " 8 " x 8 " " 12 " " 4 Diagonal Top Braces.

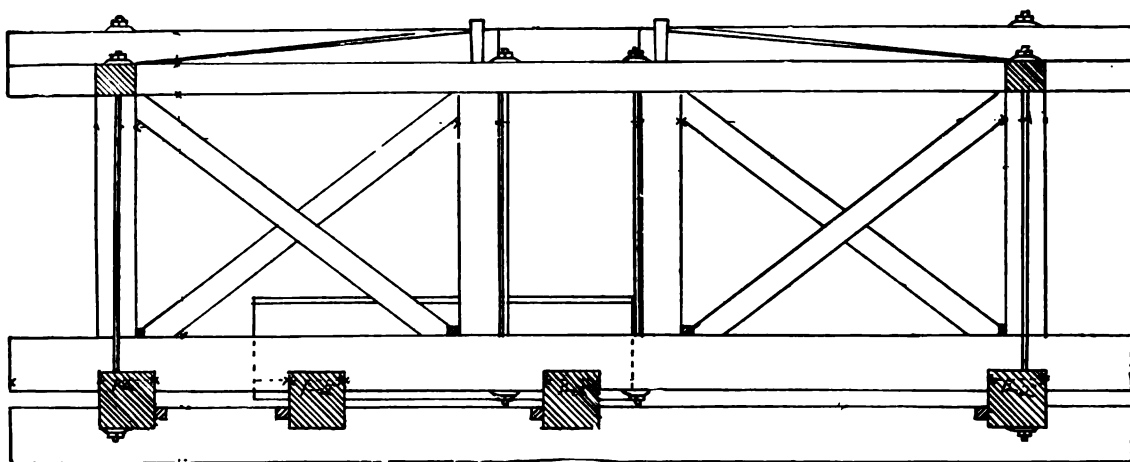
44 Keys.

SPECIAL DESCRIPTION ON APPLICATION.

ALLEN'S PUMPING RIG.

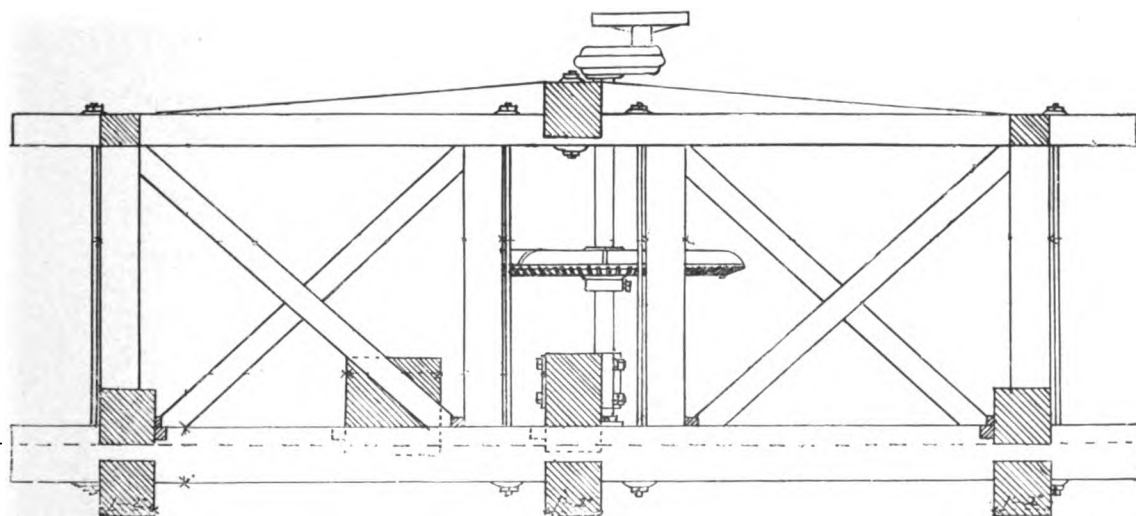
SIDE VIEW.

FIGURE 443 B.



END VIEW.

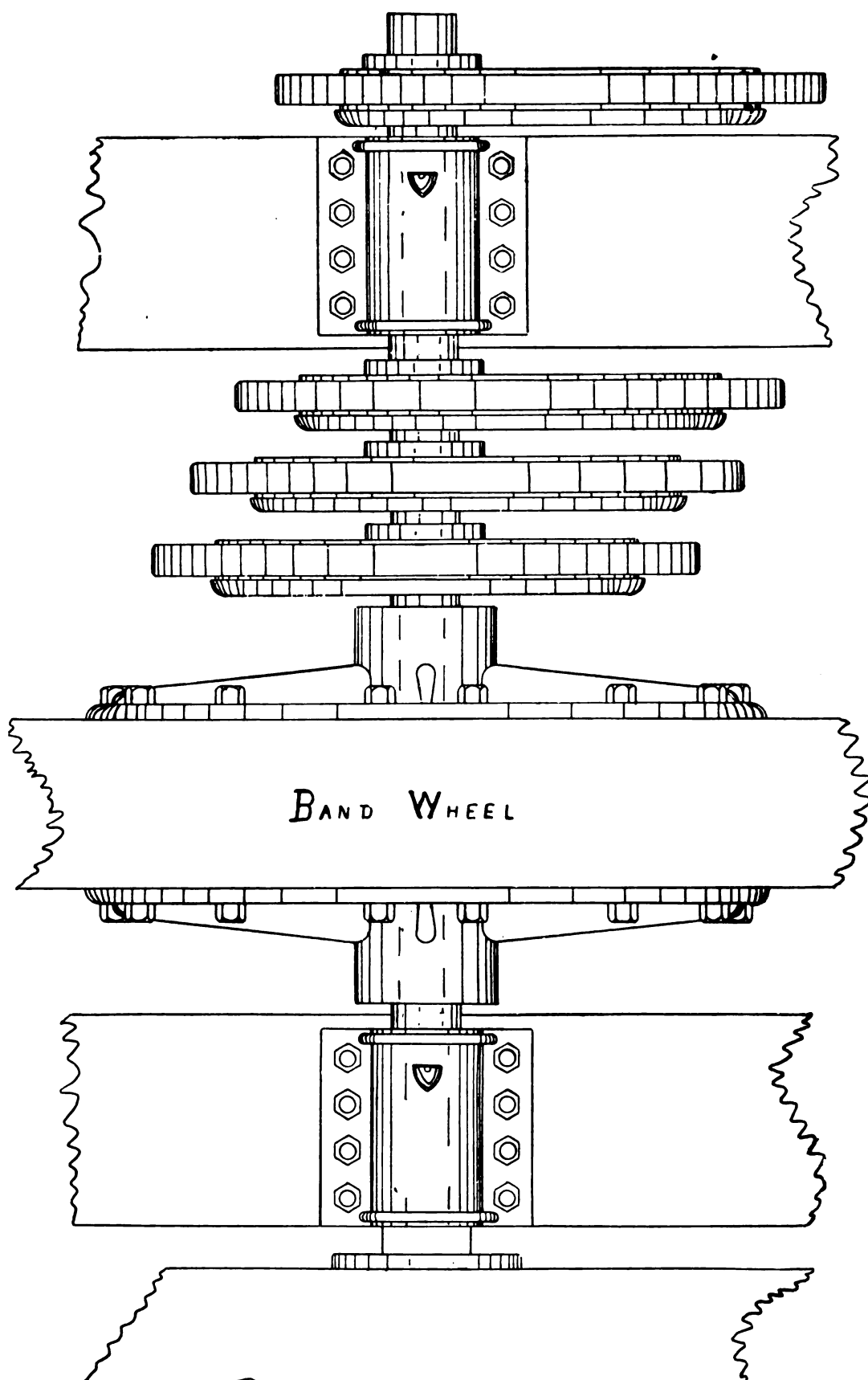
FIGURE 443 C.



ALLEN'S ECCENTRIC PUMPING RIG.

VIEW OF UPRIGHT SHAFT WITH FOUR ECCENTRICS.

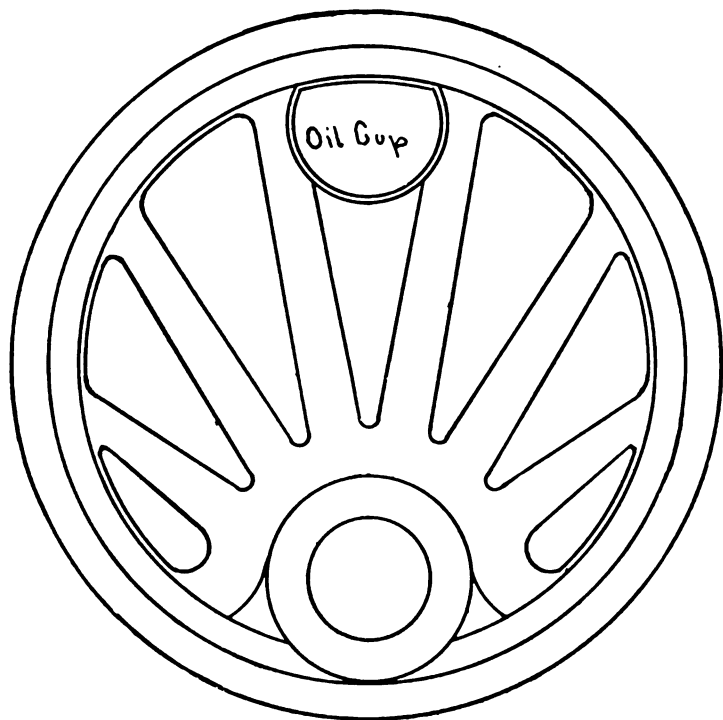
FIGURE 443 D.



ALLEN'S PUMPING RIG.

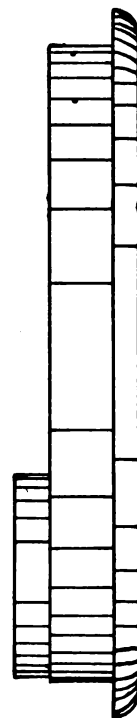
ECCENTRIC, FACE VIEW.

FIGURE 443 E.



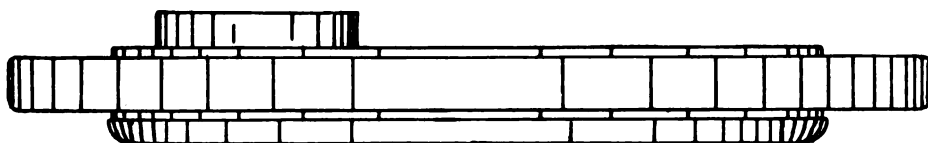
ECCENTRIC, SIDE VIEW.

FIGURE 443 F.



SIDE VIEW OF ECCENTRIC WITH STRAP.

FIGURE 443 G.



ECCENTRIC STRAP.

FIGURE 443 H.

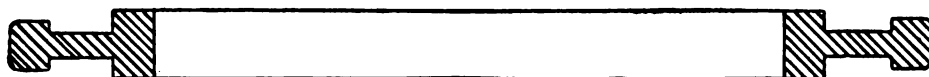


FIGURE 444.

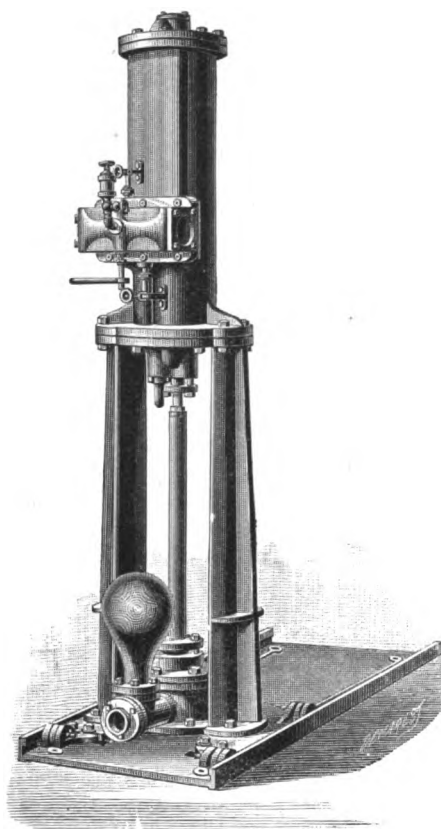
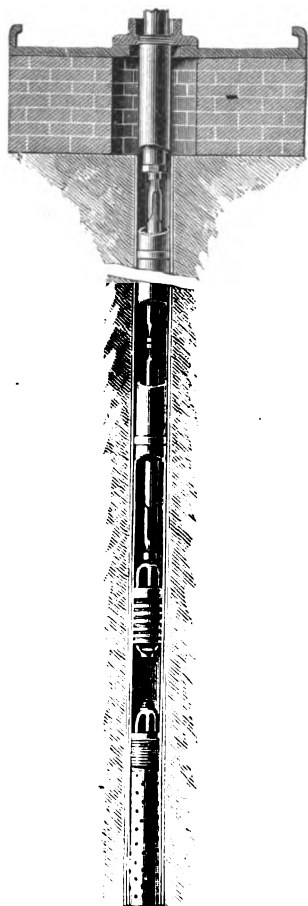


FIGURE 444 A.



Improved Vertical Engine.

FOR ARTESIAN WELLS AND DEEP WELL PUMPS.

This special form of Vertical Steam Pump is designed for pumping artesian wells when the liquids do not rise near enough to the surface to be lifted with an ordinary pump. The steam cylinder is mounted on strong columns, which are bolted to a base plate and this in turn is secured to a heavy bed plate, to which is attached the well pipe. To the lower end of the well pipe is attached the pump cylinder or working barrel; the pump bucket being connected to the upper plunger by a rod made of wood or of iron pipe. The pump bucket discharges on the up stroke. The upper plunger, shown in the engraving, discharges on the down stroke, and, being of a diameter one-half of the area of the lower bucket, the flow of water is uniform, and the pump virtually double acting.

By an improved arrangement of regulating steam valves the action of the pump can be controlled at will, making the movement of the up and down stroke uniform and regular.

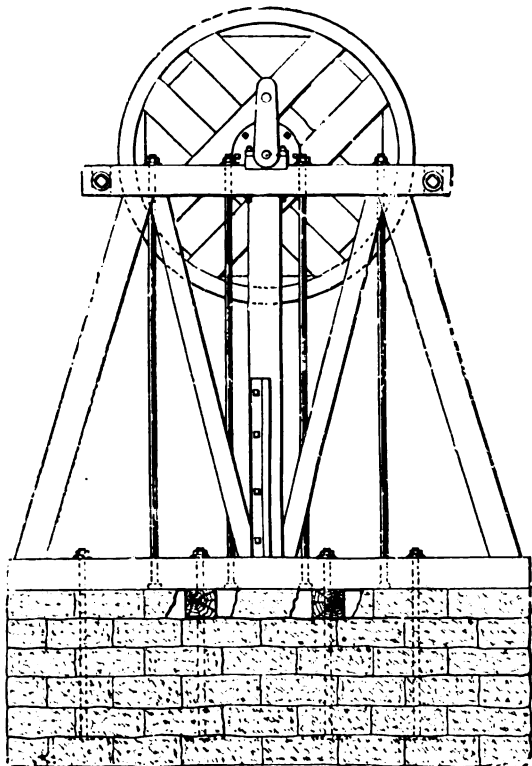
When necessary to pull the pump rods or tubing, the cylinder, with its columns and base plate can be rolled back on the bed plate away from the well.

APPARATUS TO PUMP LARGE WELLS.

TO RUN BY A BELT.

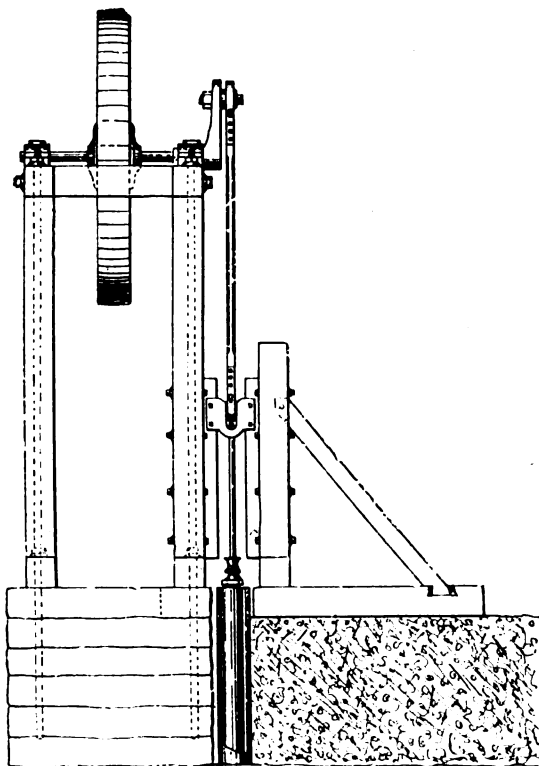
END VIEW.

FIGURE 445.



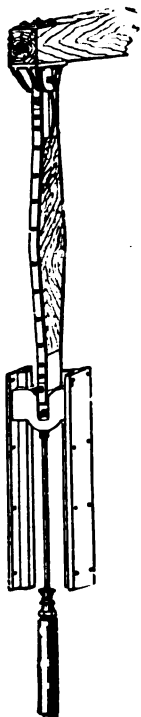
SIDE VIEW.

FIGURE 446



TO WORK ON WALKING
BEAM.

FIGURE 447.



These outfits are for large and deep wells where the pumps are run at high speed, and large quantities of water are raised.

The pumps and valves do not differ essentially from the common ones, except in being extra large and heavy.

There are two different styles (one shown in Figs. 445 and 446), with vertical direct acting attachment, and the other (Fig. 447), where the power is transmitted by means of a walking beam. Generally the band wheel attachment is the more desirable, especially when the pumps are over five inches in diameter.

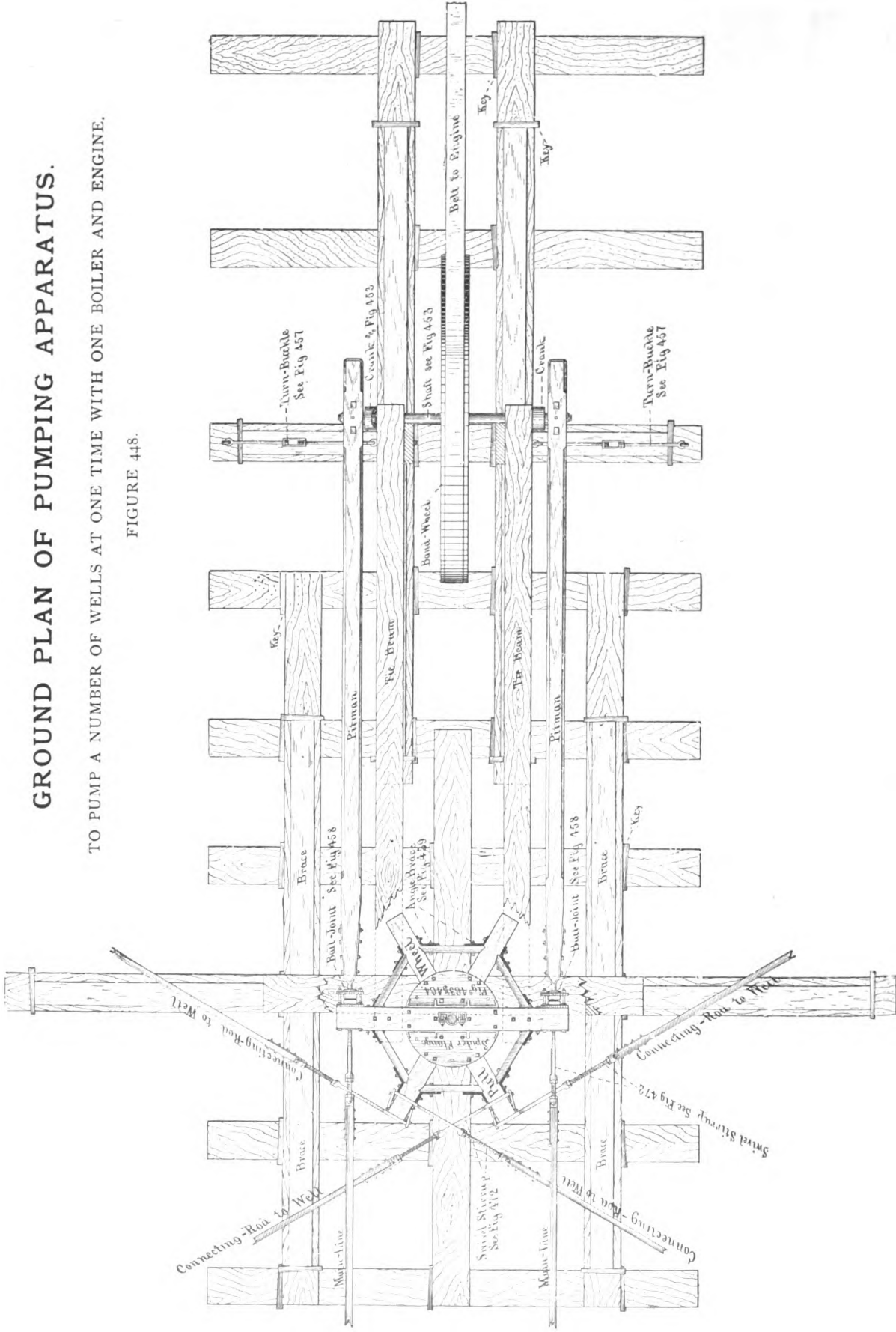
Large numbers of these outfits are in successful operation at Coal and Ore Mines, Coke Works and Railroad Pump Stations.

A specification of the timber required will be furnished on application.

GROUND PLAN OF PUMPING APPARATUS.

TO PUMP A NUMBER OF WELLS AT ONE TIME WITH ONE BOILER AND ENGINE.

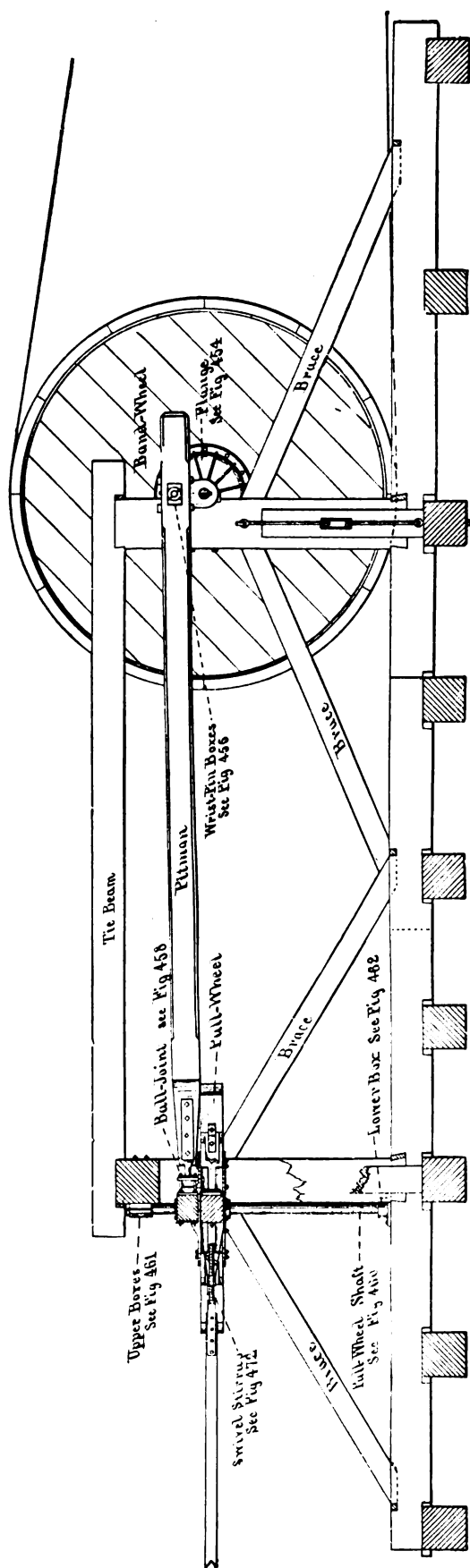
FIGURE 448.



SIDE ELEVATION OF PUMPING APPARATUS.

TO PUMP A NUMBER OF WELLS AT ONE TIME WITH ONE BOILER AND ENGINE.

FIGURE 449.



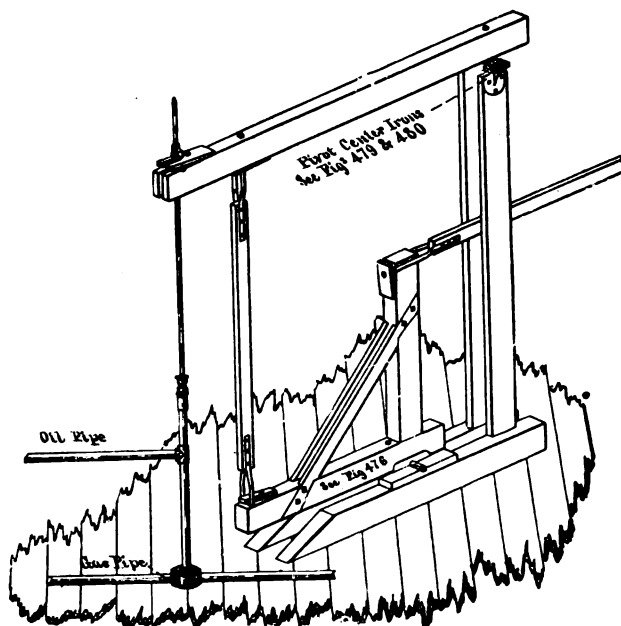
As the whole power exerted is concentrated on Band and Pull Wheels they should be so built, supported and braced as to have no vibration or liability to get out of line. The style of framing in this and the previous figure has been tried and found sufficient.

Detail working plans can be specially furnished when ordered, but the foregoing drawings are made to scale. The Mud and Main Sills are 16 inches square. The Pitman 6 x 8 inches and 28 feet long. The Band Wheel is 12 feet high.

"GRASSHOPPER" APPARATUS FOR PUMPING.

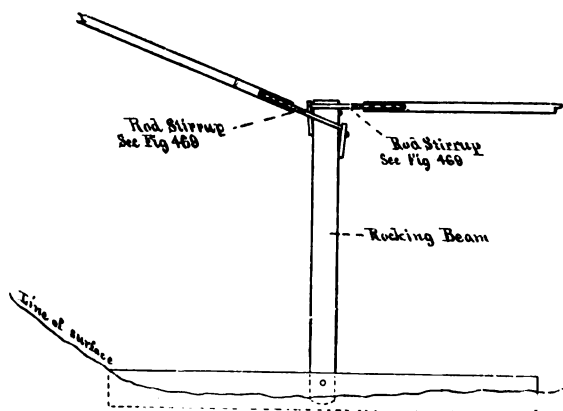
GRASSHOPPER.

FIGURE 451.



METHOD OF CHANGING INCLINATION OF RODS.

FIGURE 452.

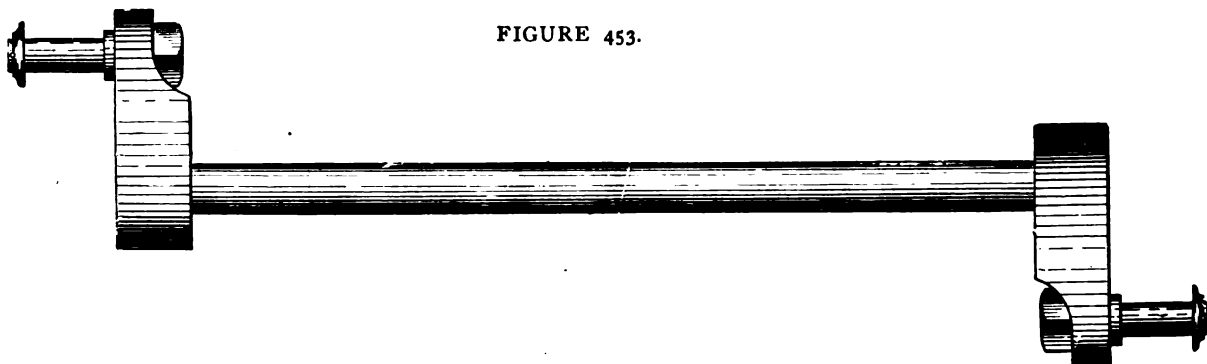


By this arrangement power can be carried up or down a hill

PARTS OF PUMPING APPARATUS.

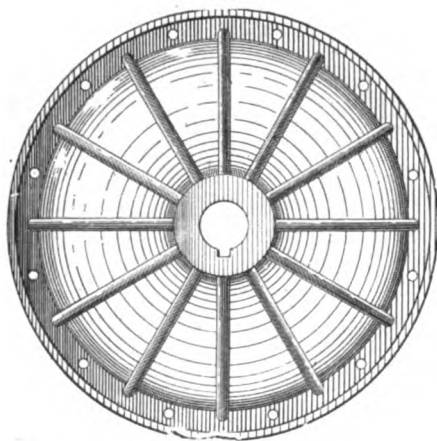
BAND WHEEL SHAFT, CRANK AND WRIST PINS.

FIGURE 453.



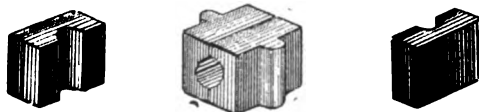
BAND WHEEL FLANGES.

FIGURE 454.



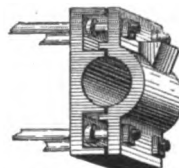
WRIST PIN BOXES.

FIGURE 455.



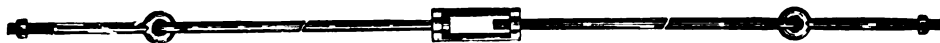
BOX FOR BAND WHEEL SHAFT.

FIGURE 456.



TURNBUCKLE.

FIGURE 457.



BALL JOINT FOR PULL WHEEL.

FIGURE 458.

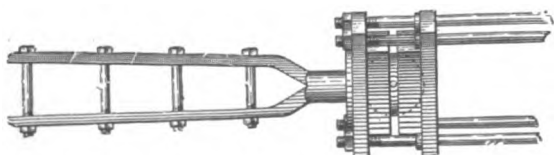
ANGLE BRACE FOR
PULL WHEEL ARMS.

FIGURE 459.



PARTS OF PUMPING APPARATUS.

PULL WHEEL SHAFT.

FIGURE 460.



BOXES FOR PULL WHEEL SHAFT.

UPPER BOX.

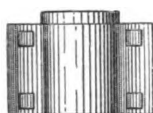


FIG. 461.

LOWER BOX.

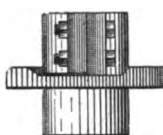
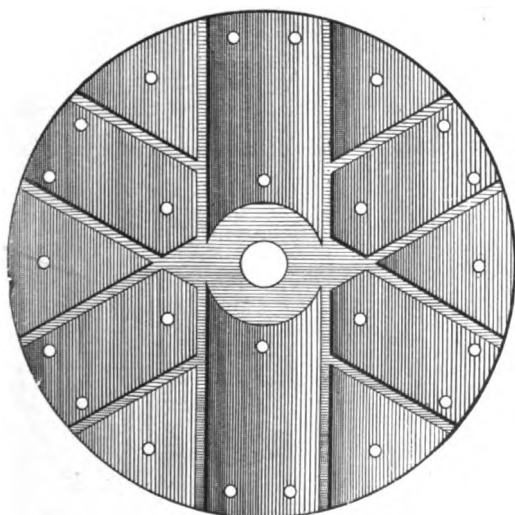


FIG. 462.

SPIDER FLANGES FOR PULL WHEEL SHAFT.

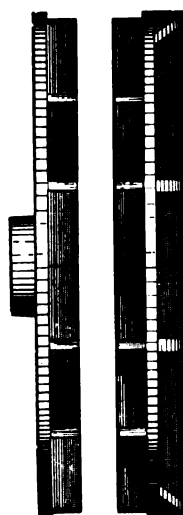
TOP VIEW.

FIGURE 463.



SIDE VIEW.

FIGURE 464.



STRAIN BOLT FOR PULL WHEEL.

BOLT.
FIGURE 465.BOX.
FIGURE 466.ROCKER.
FIGURE 467.HOOK.
FIGURE 468.

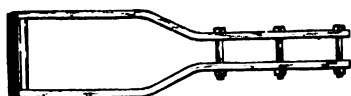
ALL COMPRISED IN A COMPLETE STRAIN BOLT.

PARTS OF PUMPING APPARATUS.

ROD STIRRUPS.

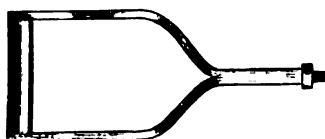
TO BOLT.

FIGURE 469.



WITH SUCKER ROD PIN.

FIGURE 469 A.



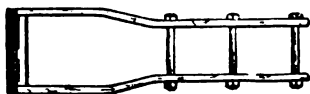
WITH SUCKER ROD BOX.

FIGURE 469 B.



PITMAN STIRRUP.

FIGURE 470.



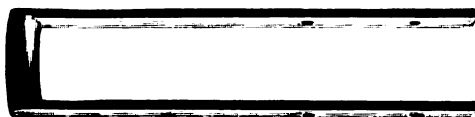
PITMAN STIRRUP.

FIGURE 470 A.



PITMAN STIRRUP.

FIGURE 470 B.



STIRRUP BOX.

FIGURE 471.



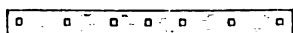
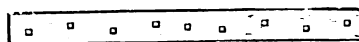
SWIVEL STIRRUP FOR PULL WHEEL.

FIGURE 472.



PARTS OF PUMPING APPARATUS.

CONNECTING ROD JOINT, (FISH PLATES.)

FIGURE 473, $2 \times \frac{3}{16}$.FIGURE 474, $2\frac{1}{2} \times \frac{1}{4}$.

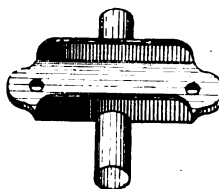
LINK CONNECTIONS.

FIGURE 475.



V JACK OR KNEE SADDLE.

FIGURE 477.



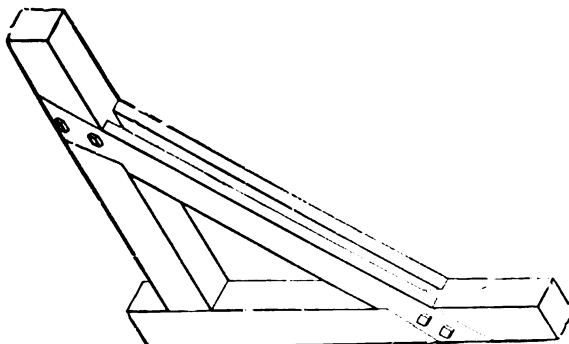
SADDLE BOX.

FIGURE 478.



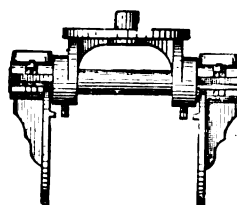
V JACK OR KNEE.

FIGURE 476.

PIVOT CENTER IRONS FOR
"GRASSHOPPER."

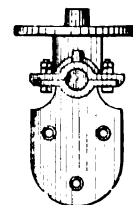
FRONT VIEW.

FIGURE 479.



SIDE VIEW.

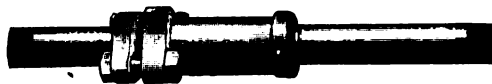
FIGURE 480.



PIPE LINE SUPPLIES.

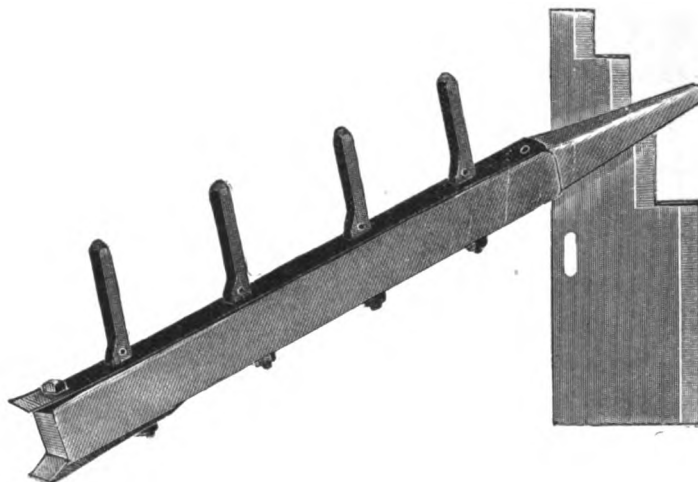
EXPANSION JOINT.

FIGURE 481.



PIPE JACK AND BOARD.

FIGURE 482 AND 483.



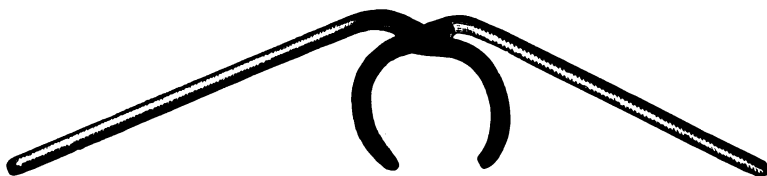
CARRYING BAR.

FIGURE 484.



CARRYING TONGS.

FIGURE 485.



SWAB AND ROD.

FIGURE 486.



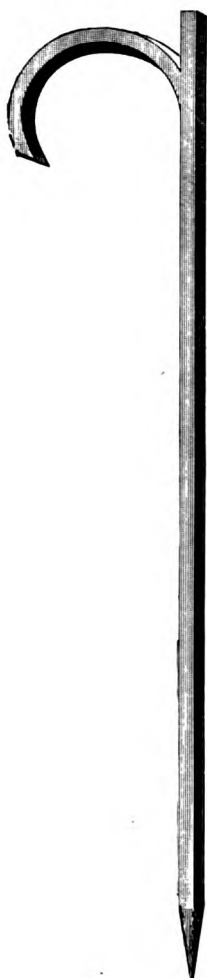
PIPE LINE SUPPLIES.

RIVER DOGS.

FOR FASTENING PIPE IN BEDS OF RIVERS.

TO DRIVE.

FIGURE 488.



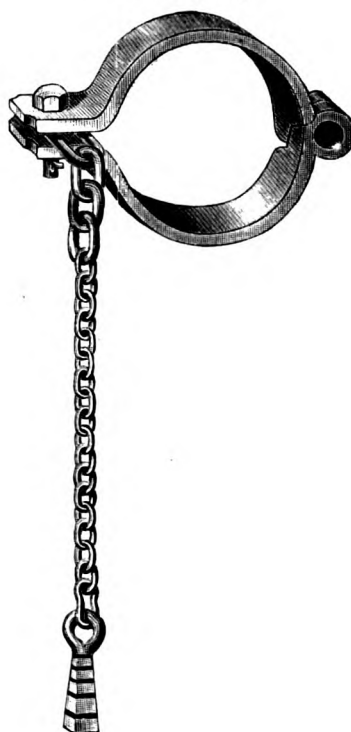
SOCKET FOR DRIVING
RIVER DOG.

FIGURE 488 A.



TO ANCHOR.

FIGURE 489.



SADDLES.

DOUBLE RINGS.

FIGURE 491.



SINGLE RING.

FIGURE 490.



INTERIOR OF
DOUBLE RINGS.

FIGURE 491 A.

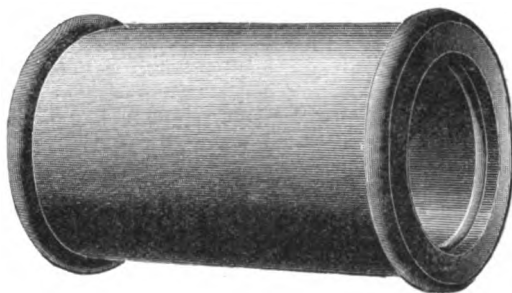


PIPE LINE SUPPLIES.

PIPE SLEEVES OR CLAMPS, PUT OVER PIPE AND COUPLINGS,
TO MAKE A JOINT OR STOP A LEAK.

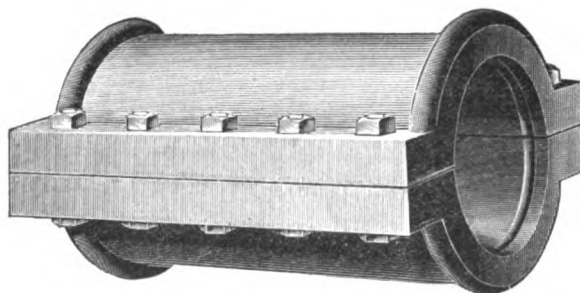
SOLID SLEEVE.

FIGURE 492.



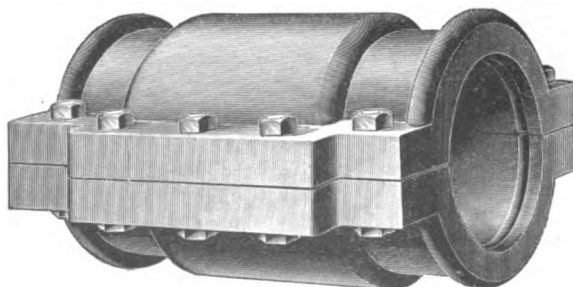
SPLIT SLEEVE.

FIGURE 492 A.



SPLIT SLEEVE FOR COUPLING.

FIGURE 492 B.



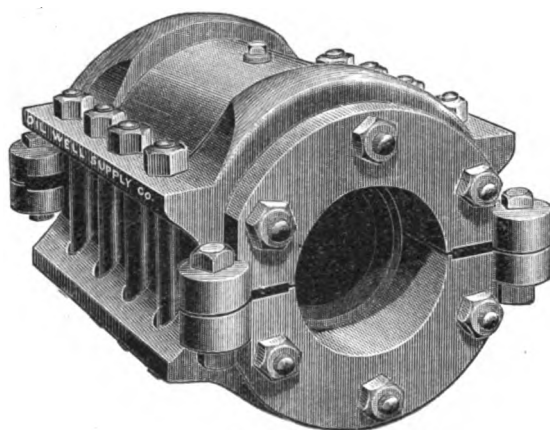
All Cast Iron.

PIPE LINE SUPPLIES.

PIPE CLAMPS.

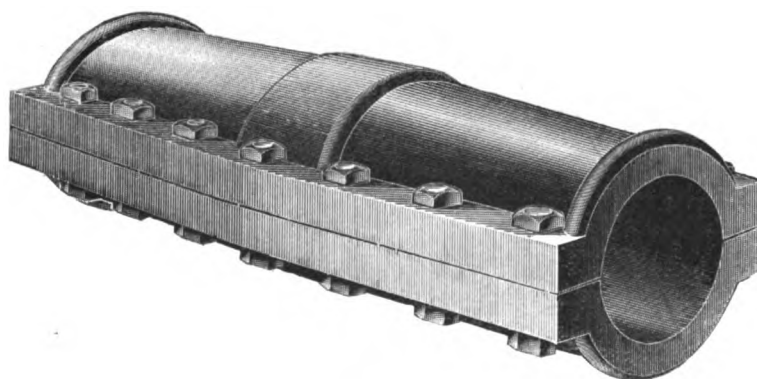
EXTRA HEAVY CLAMP WITH STUFFING BOX.

FIGURE 492 C.



RIVER CLAMP.

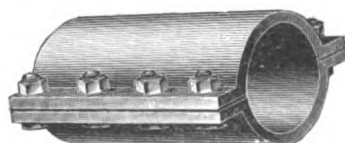
FIGURE 492 D.



To prevent joint from breaking or leaking.

WROUGHT IRON CLAMP.

FIGURE 492 E.

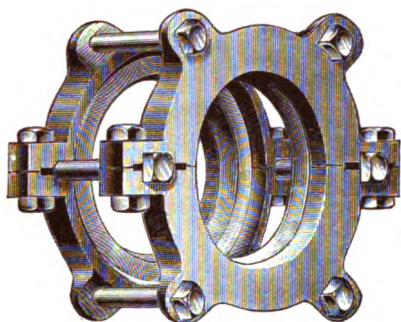


For Split Pipe.

PIPE LINE SUPPLIES.

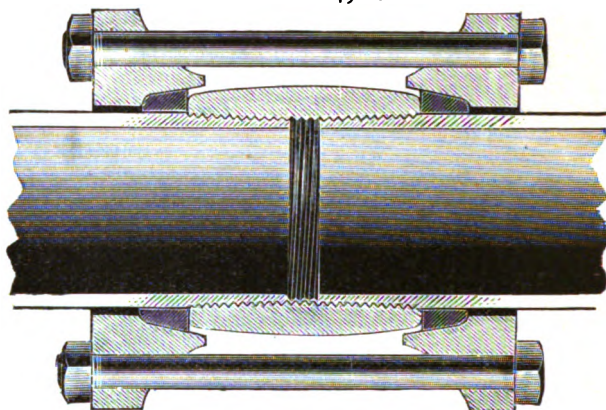
COLLAR LEAK CLAMP.

FIGURE 492 F.



SECTION.

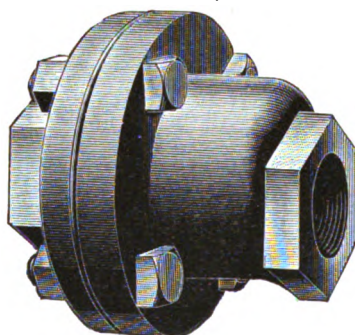
FIGURE 492 G.



To stop a leak at Coupling. A piece of square packing is placed around the pipe against the Coupling and held in place by the flanges and bolts.

BECKWITH SWING CHECK.

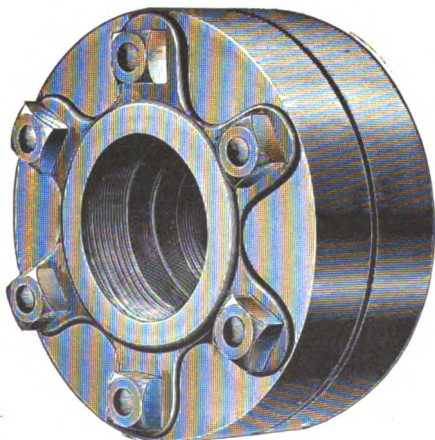
FIGURE 492 H.



To prevent oil from running back.

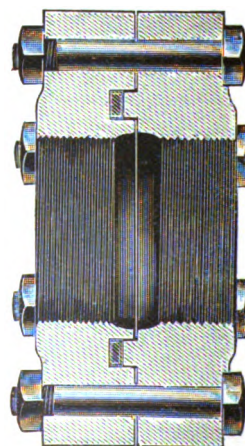
DOUBLE EXTRA HEAVY FLANGE UNION.

FIGURE 492 I.



SECTION.

FIGURE 492 J.



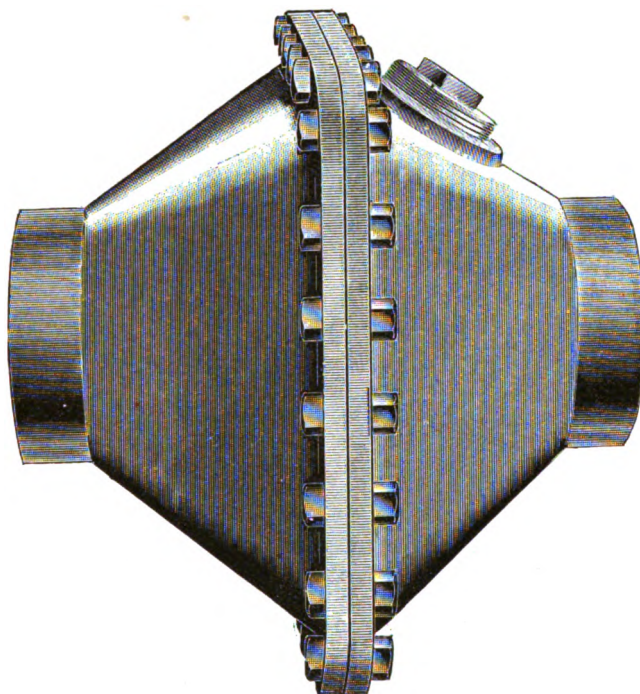
A packing of leather, rubber or other suitable substance is put in the groove and held in place by the tongue.

OIL TANK SUPPLIES.

STRAINER FOR IRON TANKS.

SIDE VIEW.

FIGURE 492 K.



STRAINER FOR IRON TANKS.

END VIEW.

FIGURE 492 L.



OIL TANK SUPPLIES.

SWING JOINTS FOR IRON TANKS.

FIGURE 492 M.

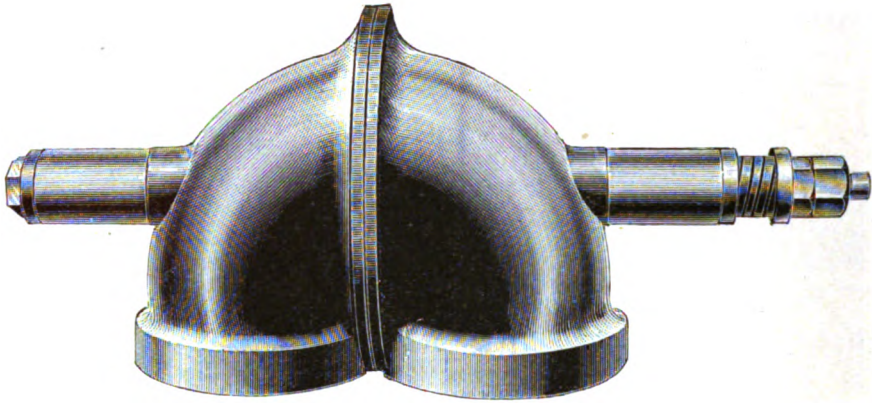
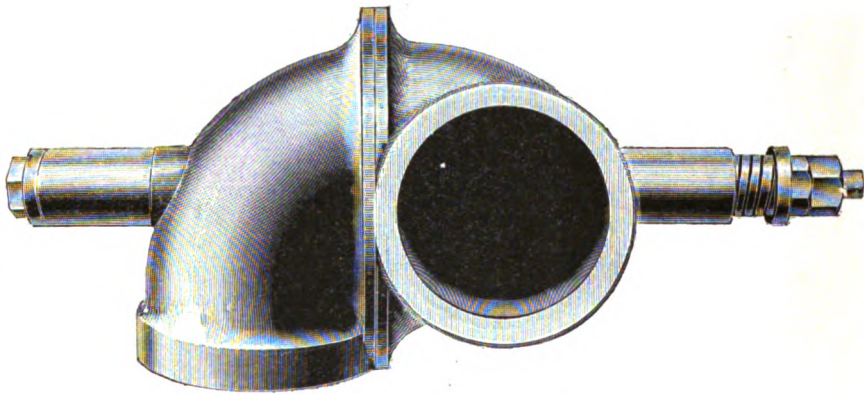


FIGURE 492 N.



MANIFOLD RECEIVING HEAD FOR IRON TANKS.

FIGURE 492 O.

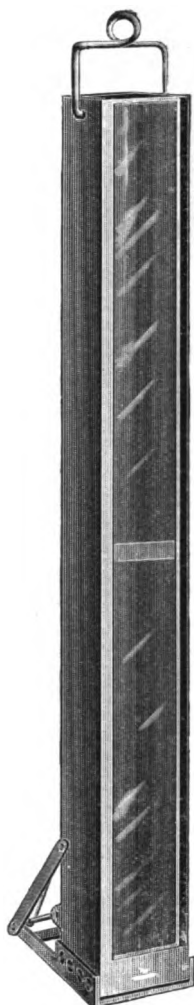


OIL TANK SUPPLIES, &c.

OIL THIEF.

FRONT VIEW.

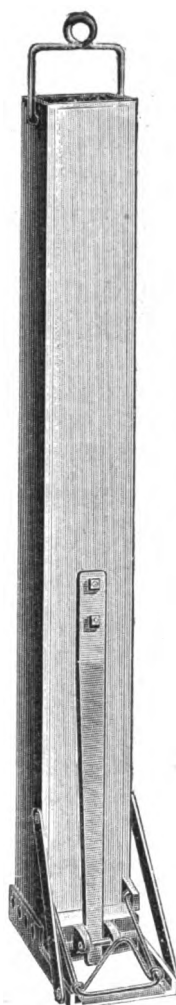
FIG. 492 P.



For taking out a specimen of the contents of a tank at any desired point, to ascertain the presence of water or the quality of the oil.

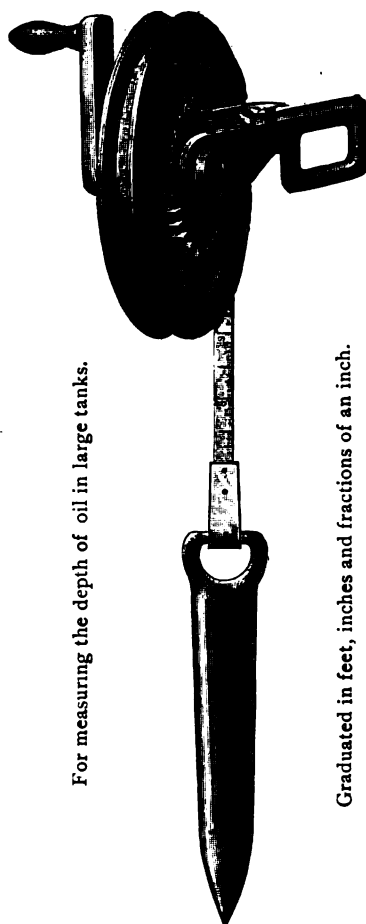
REAR VIEW.

FIG. 492 Q.



GAUGE LINE.

FIG. 492 R.

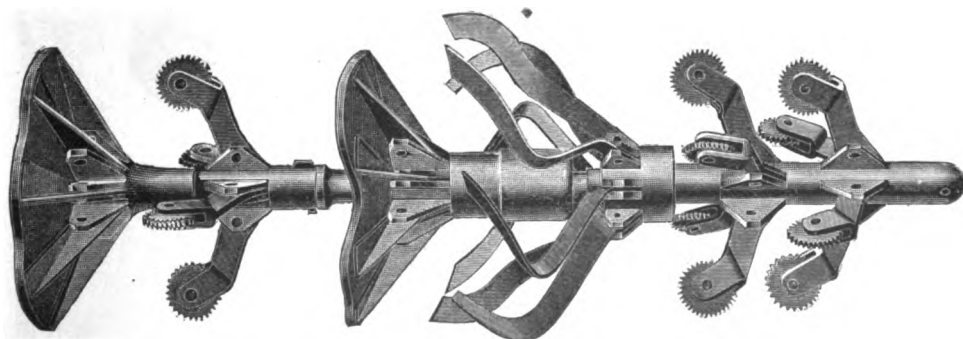


For measuring the depth of oil in large tanks.

Graduated in feet, inches and fractions of an inch.

GO-DEVIL FOR SCRAPING THE INSIDE OF AN OIL LINE.

FIG. 492 S.



When the oil line is obstructed by paraffine this device is inserted and forced ahead by the current of oil. It thoroughly cleans the inside of the pipe.

TAPPING MACHINES.

LETZKUS' PATENTS.

FIG. 495.

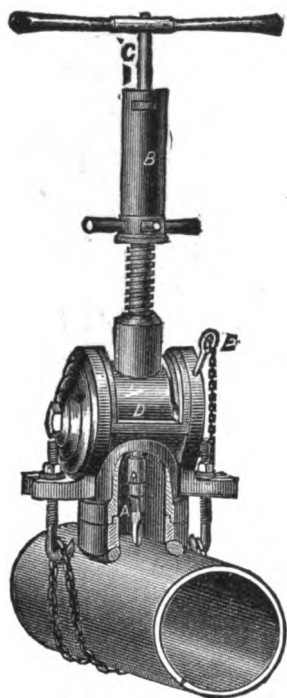
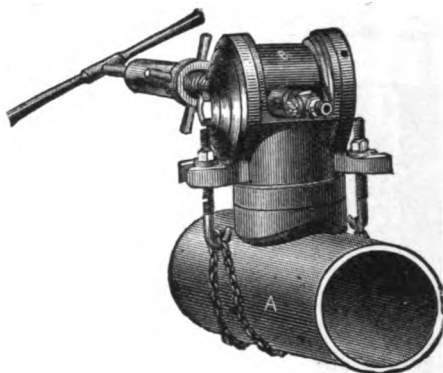


FIG. 496.



This machine drills a hole in the street main, screw-threads it, and inserts a stop cock, without losing any appreciable amount of water or gas, no matter how high the pressure in the pipe.

In Figure 495 it is ready for work. The drill and tap are in one tool, shown at "A." The hole is drilled and screw-threaded by turning the spindle "C." The tool is withdrawn from the hole, the steady pin removed, the upper part of the machine is turned on the joint in the drum "D," at right angles to its former position (see Figure 496), the drill "A" is taken off and the stop cock and ferrule put in its place, the tool is thrown back to its first position (Figure 495) and the ferrule is screwed in.

FIG. 497.

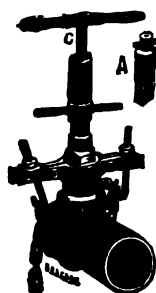


FIG. 498.



Figure 497 drills and taps a hole in cast and wrought iron low pressure gas mains, or in dry pipes.

Figure 498 is to drill into wrought iron gas mains. A saddle (Figure 491) is attached to the main, a stop cock (with the plug open) is screwed into the saddle, and the machine is screwed into the stop cock. The drill is long enough to pass through the stop cock. The hole is drilled, the drill withdrawn, and the plug turned. The amount of gas which escapes, even from a high pressure line, is very small.

TAPPING MACHINES.

PAYNE'S PATENT STEAM, GAS OR WATER PIPE TAPPING MACHINE.

FIGURE 499.

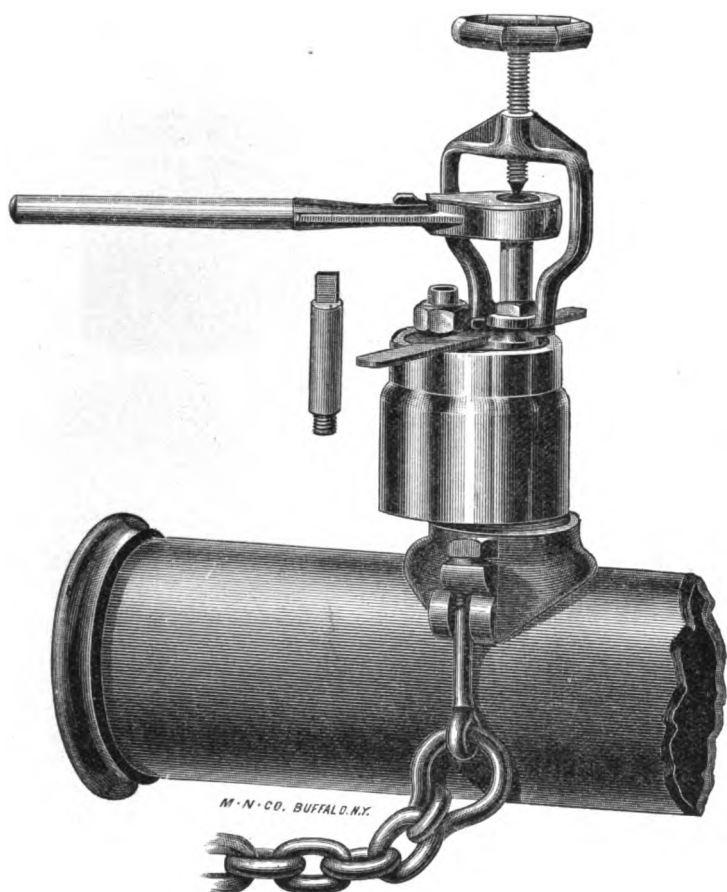
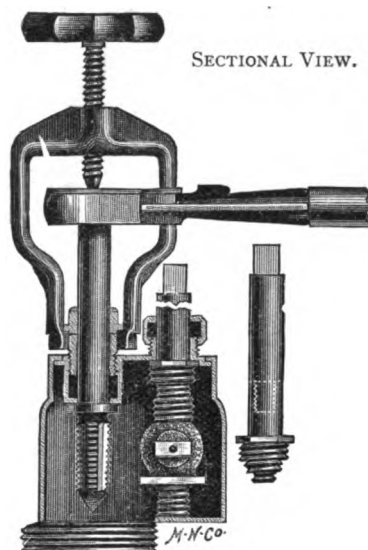


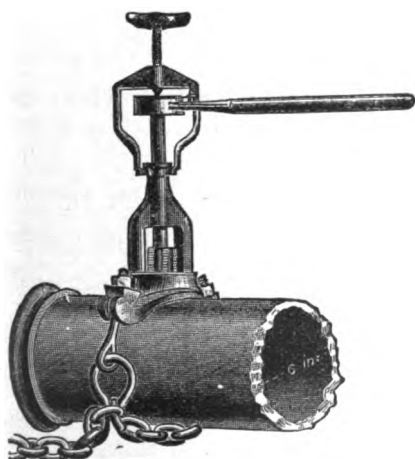
FIGURE 499 A.

SECTIONAL VIEW.



DRY TAPPER.

FIGURE 499 B.



The head of this machine holds the tap and the cock. By turning the head half way the cock and tap exchange places. When the hole is tapped the drill is drawn up, the head shifted and the cock screwed in.

Made in three sizes. Three saddles and three taps furnished with each machine.

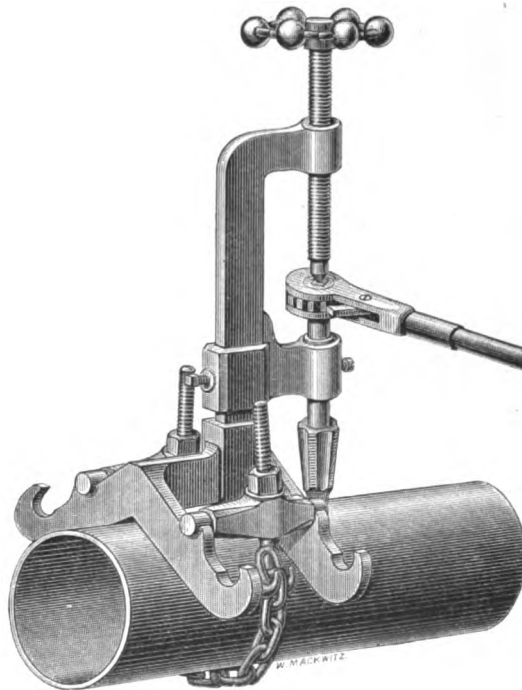
Special circular furnished on application.

For boring and tapping holes in dry pipe or low pressure gas pipes.

TAPPING MACHINES.

MUELLER'S DRY PIPE AND GAS MAIN TAPPING MACHINE.

FIGURE 499 E.



This Machine is adapted to the wants of Gas Companies, Pipe Fitters, Structural Iron Works, etc., for drilling and tapping $\frac{1}{2}$ to 2 inch holes in Pipes and Columns.

In ordering state sizes of Taps desired, and size of Largest Main to be tapped. If not specified, chain for 12 inch pipe will be sent. Taps with Iron Pipe thread will be sent unless otherwise ordered.

Special Taps of any desired size and thread made to order.

CASING, LINE PIPE AND TUBING.

SLEEVE COUPLING, TAPER THREADS.

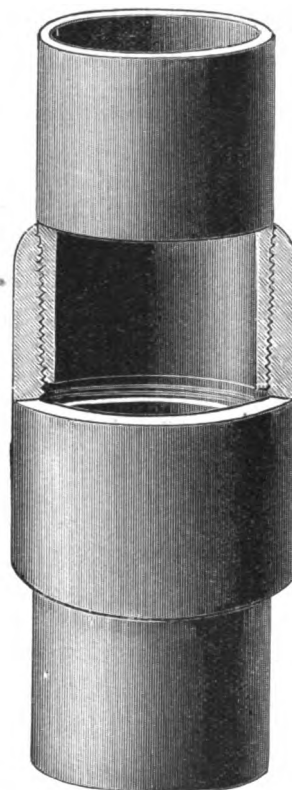
FIGURE 500 A.



Casing Joint.

SEMI-VANISHING THREADS.

FIGURE 500 B.



Line Pipe and Tubing Joint

The Sleeve Coupling is used on casing, line pipe and tubing. The threads on the tube and in the coupling are cut on a taper. The sleeve protects the threads of the couplings and guides the end of the tube. The last thread on the tube is nearly as deep as the first, and the tube is weakest and most liable to break at the last thread.

The "SEMI-VANISHING THREAD JOINT" has merely a scratch for the last thread, the next being a little deeper, and so increasing until the threads are full, the depths of the threads in the coupling being reversed, so that when the tube is screwed up, the tube and couplings are in perfect contact the entire length of the thread.

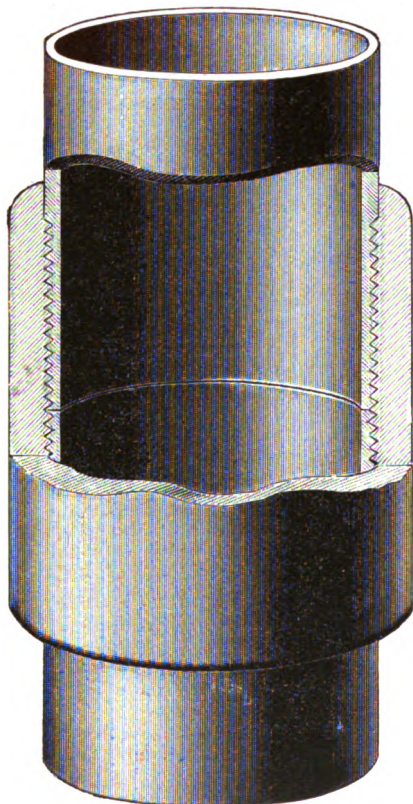
This is the best and strongest joint made. There is no danger of the tube's breaking off at the thread under any circumstances, and the joint is tight at the highest pressures, either hot or cold.

Standard fittings can be used on pipe having this thread.

DRIVE PIPE AND FLUSH JOINT PIPE.

DRIVE PIPE, COUPLING JOINT.

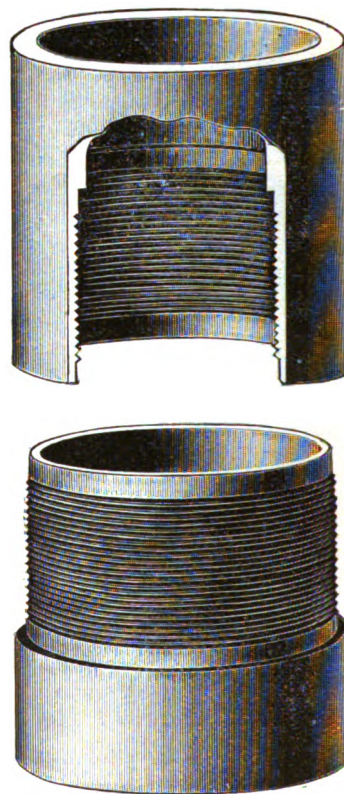
FIGURE 500 C.



Straight Threads.

FLUSH JOINT PIPE.

FIGURE 500 D.



Can be driven if light blows are carefully given.

Figure 261 shows Drive Pipe with taper threads. The threads must be straight.

Threads on DRIVE PIPE are straight, and the ends meet or "butt" in the center of the coupling. This pipe will stand heavy driving.

FLUSH JOINT DRIVE PIPE, TUBING OR PIPE is made by cutting away portions of the tubes and putting threads thereon. The pipe has the same inside and outside diameters at the joint as at other places so that it is perfectly flush both inside and out.

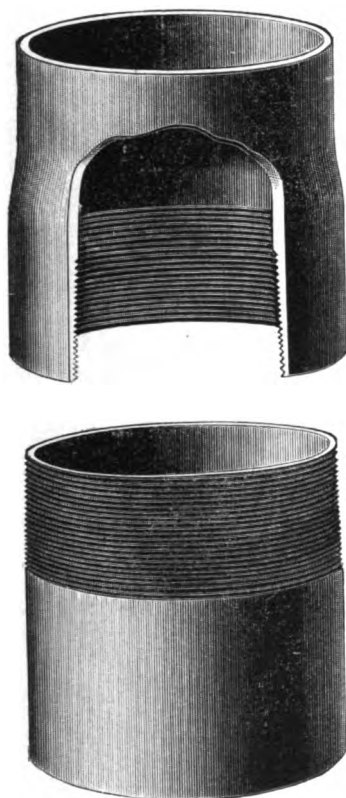
A larger size of flush joint pipe can be used in wells, than of pipe with couplings, but it is not so strong.

Flush joint pipe can be driven if care is used, but for driving purposes it is better to make it of Extra Strong Pipe.

INSERTED AND FLUSH JOINT CASING.

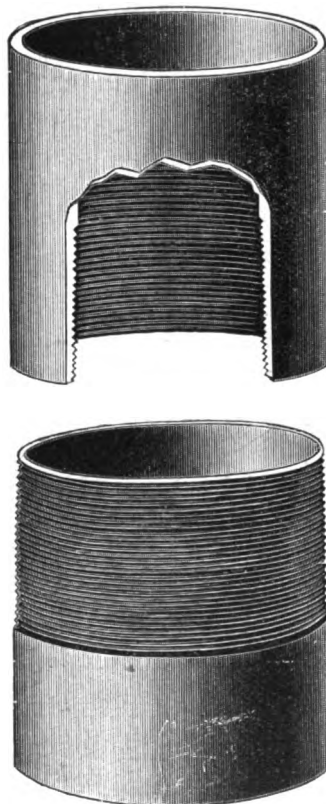
INSERTED JOINT.

FIGURE 500 E.



FLUSH JOINT.

FIGURE 500 F.



INSERTED JOINT CASING AND FLUSH JOINT CASING are sometimes used in oil and gas wells instead of flush joint pipe, being lighter and having more inside space for the tools. It should not be driven.

The "INSERTED JOINT CASING" is made by cutting a thread on one end and expanding the other and cutting in it an interior thread, so that the end of one piece screws into the end of another.

"FLUSH JOINT CASING" is made by cutting interior and exterior taper threads on respective ends of the pipe, so that the end of one piece will screw into the other. This joint is not strong and the casing must be used with great care.

SIZES OF CASING.

Nominal Inside Diameter.	Outside Diameter.	Nominal Weight Per Foot.	Number of Threads per inch of Screw.	Outside Diameter of Couplings.
Inches.	Inches.	Pounds.		Inches.
2	2 $\frac{1}{4}$	2.16	14	2.687
2 $\frac{1}{4}$	2 $\frac{1}{2}$	2.75	14	2.875
2 $\frac{1}{2}$	2 $\frac{3}{4}$	3.04	14	3.187
2 $\frac{3}{4}$	3	3.33	14	3.500
3	3 $\frac{1}{4}$	3.96	14	3.781
3 $\frac{1}{4}$	3 $\frac{1}{2}$	4.28	14	4.000
3 $\frac{1}{2}$	3 $\frac{3}{4}$	4.60	14	4.250
3 $\frac{3}{4}$	4	5.47	14	4.625
4	4 $\frac{1}{4}$	5.85	14	4.687
4 $\frac{1}{4}$	4 $\frac{1}{2}$	6.00	14	4.937
4 $\frac{1}{2}$	4 $\frac{1}{2}$	9.00	14	
4 $\frac{1}{2}$	4 $\frac{3}{4}$	6.55	14	5.218
4 $\frac{1}{2}$	4 $\frac{3}{4}$	9.00	14	
4 $\frac{3}{4}$	5	7.58	14	5.562
5	5 $\frac{1}{4}$	8.00	14	5.781
5	5 $\frac{1}{4}$	10.00	14	
5	5 $\frac{1}{4}$	13.00	11 $\frac{1}{2}$	
5	5 $\frac{1}{4}$	17.00	11 $\frac{1}{2}$	
5 $\frac{3}{8}$	5 $\frac{1}{2}$	8.40	14	6.062
5 $\frac{3}{8}$	5 $\frac{1}{2}$	13.00	11 $\frac{1}{2}$	
5 $\frac{5}{8}$	6	10.16	14	6.625
5 $\frac{5}{8}$	6	12.00	11 $\frac{1}{2}$	
5 $\frac{5}{8}$	6	14.00	11 $\frac{1}{2}$	
5 $\frac{5}{8}$	6	17.00	11 $\frac{1}{2}$	
6 $\frac{1}{4}$	6 $\frac{5}{8}$	11.50	14	7.125
6 $\frac{1}{4}$	6 $\frac{5}{8}$	13.00	14	
6 $\frac{1}{4}$	6 $\frac{5}{8}$	17.00	11 $\frac{1}{2}$	
6 $\frac{5}{8}$	7	12.45	14	7.687
6 $\frac{5}{8}$	7	17.00	11 $\frac{1}{2}$	
7 $\frac{1}{4}$	7 $\frac{5}{8}$	13.50	14	8.220
7 $\frac{5}{8}$	8	15.00	11 $\frac{1}{2}$	8.625
7 $\frac{5}{8}$	8	20.00	11 $\frac{1}{2}$	
8 $\frac{1}{4}$	8 $\frac{5}{8}$	16.00	11 $\frac{1}{2}$	9.312
8 $\frac{1}{4}$	8 $\frac{5}{8}$	20.00	11 $\frac{1}{2}$	
8 $\frac{1}{4}$	8 $\frac{5}{8}$	24.00	11 $\frac{1}{2}$	
8 $\frac{5}{8}$	9	17.50	11 $\frac{1}{2}$	9.750
9 $\frac{5}{8}$	10	21.00	11 $\frac{1}{2}$	10.812
10 $\frac{5}{8}$	11	23.00	11 $\frac{1}{2}$	
11 $\frac{5}{8}$	12	25.15	11 $\frac{1}{2}$	
12 $\frac{1}{2}$	13	35.75	11 $\frac{1}{2}$	
13 $\frac{1}{2}$	14	38.82	11 $\frac{1}{2}$	
14 $\frac{1}{2}$	15	42.00	11 $\frac{1}{2}$	
15 $\frac{1}{2}$	16	45.10	11 $\frac{1}{2}$	

Inserted Joint or Flush Joint Casing of any of the sizes mentioned.

Any size of Casing galvanized if desired.

DRIVE PIPE.

Size, Nominal Inside Diameter.	Thickness.	Nominal Weight Per Foot.	No. of Threads Per Inch.	Outside Diameter of Couplings.
Inches.	Inches.	Pounds.		Inches.
3	.217	7.54	8	4.062
4	.237	10.66	8	5.187
6	.280	18.76	8	7.343
8	.322	28.18	8 }	9.375
	. . .	32.00	8 }	
10	.366	40.06	8	11.68
12	.375	49.00	8	13.93
14	.375	58.00	8	

LINE PIPE.

Size, Nominal Inside Diameter.	Thickness.	Nominal Weight Per Foot.	N o. of Threads Per Inch.	Outside Diameter of Couplings.
2	.154	3.61	11 1/2	2.937
2 1/2	.204	5.74	{ 11 1/2 8	3.5
3	.217	7.54	{ 11 1/2 8	4.062
3 1/2	.226	9.00	{ 11 1/2 8	4.687
4	.237	10.66	{ 10 8	5.187
4 1/2	.246	12.49	8	5.75
5	.259	14.50	8	6.343
6	.280	18.76	8	7.343
7	.301	23.27	8	8.437
8	.322	28.18	8 }	9.375
8		25.00	8 }	
10	.366	40.06	8 }	11.68
10		35.00		
12	.375	49.00	8	13.93

TUBING.

Size, Nominal Inside Diameter.	Thickness.	Nominal Weight Per Foot.	No. of Threads Per Inch.	Outside Diameter of Couplings.
1	.134	1.67	11 1/2	1.687
1 1/4	.140	2.24	11 1/2	2.062
1 1/2	.145	2.68	11 1/2	2.375
2	.154	4.00	11 1/2	2.937
2 1/2	.204	5.74	11 1/2	3.5
3	.217	7.54	11 1/2	4.062
3 1/2	.226	9.00	11 1/2	4.687
4	.237	10.66	10	5.187
6	.280	18.76	8	7.343

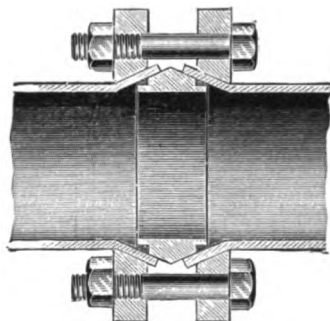
Flush Joint Drive Pipe, Line Pipe or Tubing of any of the sizes mentioned.

LIGHT PIPE.

WILLIAMS' PATENT JOINT FOR LIGHT PIPE.

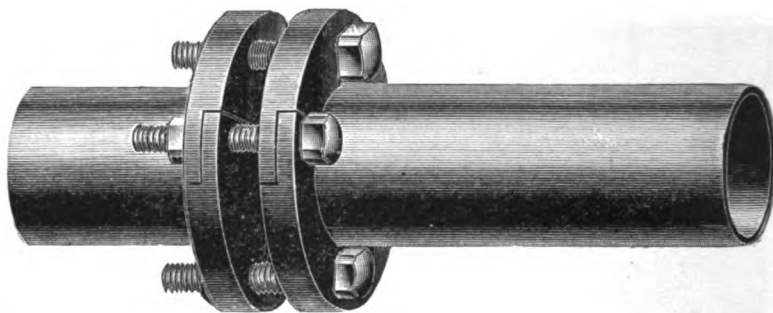
FIGURE 500 G.

SECTION SHOWING PACKING, &C.



SHOWING JOINT COMPLETE WITH SEGMENTAL FLANGES.

FIGURE 500 H.



Pipe is furnished with Flanges, Bolts, Ferrules and Packing, all complete, ready for use.

The ends of the pipe are flared. A cast iron ferrule, having at each end a packing ring of lead, rubber, asbestos or other substance, slightly larger than the ferrule, is placed between the two flared ends. Flanges made in two parts, with the inner surface flared same as the pipe, are placed thereon and drawn together by the bolts, making a perfectly tight joint, which can be used for steam, gas, water or compressed air. These joints have borne a pressure of 4000 pounds to the square inch.

In consequence of the flared part being *on* the packing ring, expansion and contraction of the pipe will not disturb it. The flare moves on the packing against which it is firmly held by the flanges and bolts. The packing cannot be blown out.

No threads being cut on the pipe or any holes for rivets, light pipe with this joint is really stronger than heavier pipe with a deep thread, as the strength of the heavy pipe is only as great as its weakest point.

The pipe can be connected at a considerable angle or moved out of line. The flaring can easily be done by any blacksmith, and, consequently, the pipe can be cut as desired.

This pipe is used largely for mining purposes, both vertically and horizontally. Being light it is easily transported.

If a flange or ferrule should break, any blacksmith can make wrought iron ones, and any kind of packing can be used.

SIZES OF
LIGHT PIPE.

Actual O. D.	Thickness B. W. G.	Weight per Foot, complete.
2	13	1.86
3	12	3.40
4	10½	5.25
5	9½	7.30
6	9½	8.75
7	9	10.75
8	8½	13.00
9	8½	14.65
10	8	17.08
11	7½	19.50
12	6	25.12
13	6	27.39
14	5½	31.00
15	4½	35.42
16	3½	42.00
17	2½	48.00
18	1½	56.00
19	1	60.00
20	0½	67.00

PIPE TRADE CUSTOMS.

Every piece of pipe, tubing, casing, line-pipe, drive-pipe and boiler tube is carefully examined and tested ; but as it is impossible to always detect imperfections, the only guarantee that is ever given is to replace such goods as prove defective. Under no circumstances is the seller responsible for any damages beyond the price of the goods. No charges for labor or expenses required to repair defective goods or occasioned by them will be allowed. If goods are defective, the measure of damages is the price of the defective pieces.

To equalize the prices in different places, goods are sometimes sold "freight allowed to destination," or with a mentioned freight allowance ; but this freight allowance is only a discount on the price and is not a contract for delivery ; the shipper's responsibility ends when goods are delivered to the transportation company.

For goods lost or damaged in transit, buyers must look to the carriers only.

Shipments by land, river or lake, will be insured only when buyers so instruct.

Ocean shipments are insured for the benefit of the consignee and the premium is charged. If buyers do not desire such insurance they should so advise with the order.

Claims for shortage or deductions for erroneous charges must be promptly presented.

Ordinary merchant pipe is sold in random lengths, with threads on both ends and with a coupling on one end of each piece.

X Strong, XX Strong and Hydraulic Pipe are sold without threads or couplings, unless threads and couplings are specified, and then an additional charge is made for such threads and couplings.

An extra charge is always made for pipe cut to special lengths.

Pipe "cut to order," is threaded at each end, but no couplings are furnished. If couplings are desired, they must be ordered and an extra charge will be made for them.

When pipe is ordered cut to a particular length "with couplings," a coupling is screwed on one end and is measured in the length.

There is no such thing known in the trade as "Double Thick Pipe." When pipe heavier than standard is required, either X Strong, XX Strong or Hydraulic should be ordered, and the thickness of Hydraulic pipe must be specified.

Standard weight casing (the lightest weight) is always furnished on orders unless another weight is specified.

The outside diameter of goods heavier than "standard" is the same as standard, the extra thickness being on the inside, so that the different weights of the same size use the same couplings.

Sheet iron thread protectors are not charged.

Wrought iron thread protectors on line pipe are charged, but if returned, credit will be given at prices charged.

Boiler tubes are sold cut to length without extra charge for cutting.

Boiler tubes are rated by their outside diameters ; all other pipe by the nominal inside diameter, but goods heavier than "standard," are less in actual diameter than in nominal diameter.

Quotations are for immediate acceptance.

Prices are subject to change without notice.

All pipe orders are accepted subject to strikes, accidents and other unavoidable delays.

The time of delivery is never of the essence of a pipe contract.

When shipments are made consigned to our own order, such shipments are for the accommodation of the buyer and are subject to the same rules as if shipped to the buyers. That is to say, all damages and all losses in transportation must be borne by the buyer. The shipper's claim against the transportation company, if any, will be assigned to the buyer, without recourse.

TERMS OF SALE.

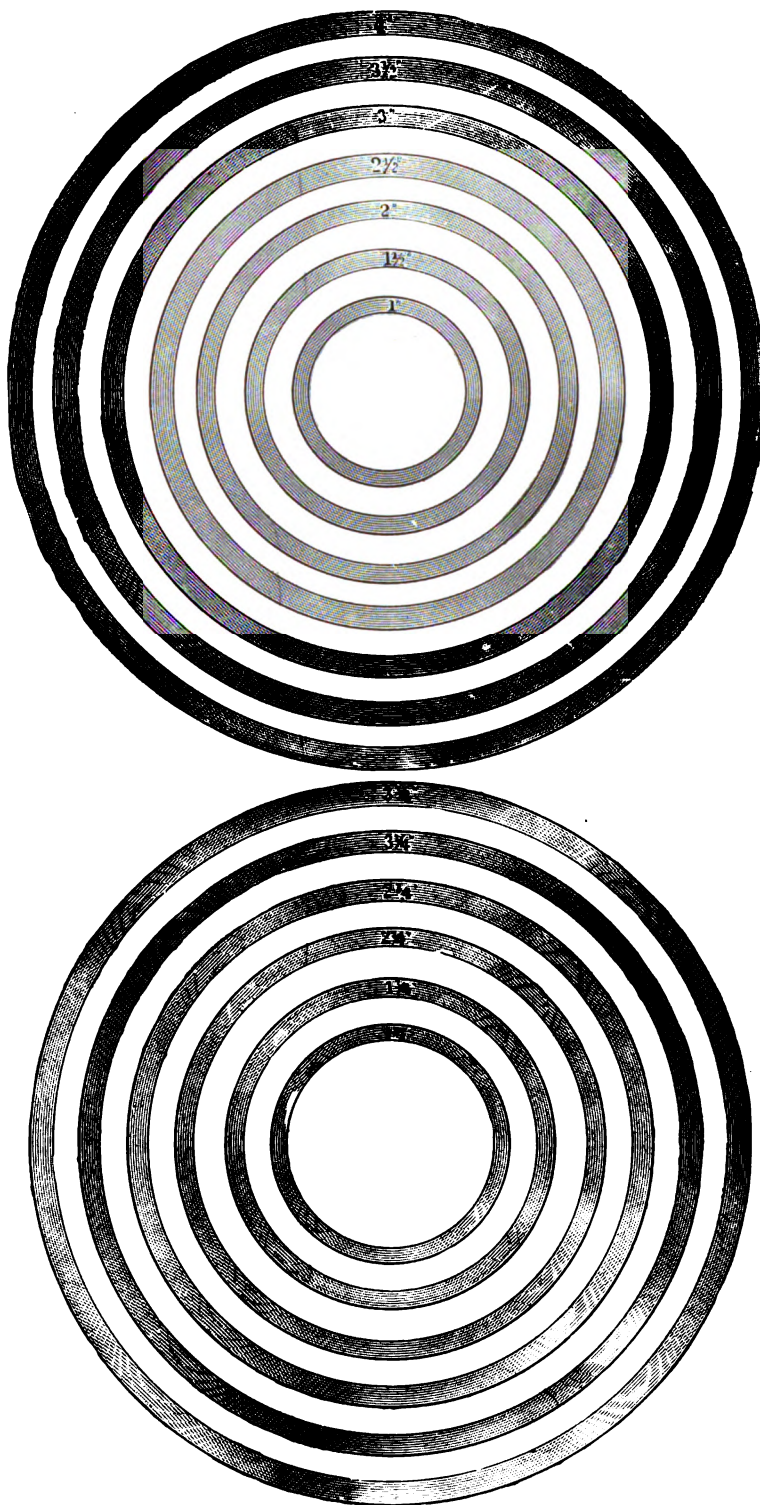
Settlements within thirty days from date of shipment.

Regular accounts are to be settled monthly, in thirty days from the average date of the month's invoices. If longer time is specially given by contract, settlement must be made by note or acceptance.

BOILER TUBES.

FIGURE 500.

The cuts show the inside and outside diameters of the sizes from one inch to four inches.
Boiler tubes are sized by their outside diameters.



The table below shows the thickness of each size, in decimal fractions of an inch, and the nearest Birmingham Wire Gauge (B. W. G.) number to such thickness. The nominal weight per foot is also given, but this weight varies slightly.

SIZES OF BOILER TUBES.

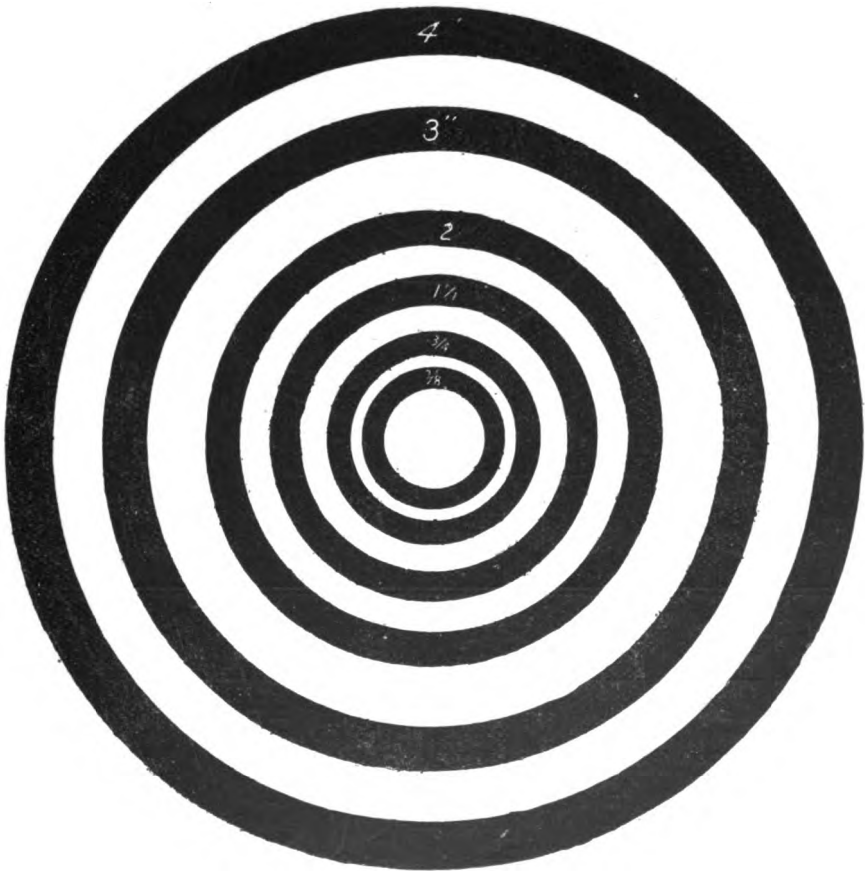
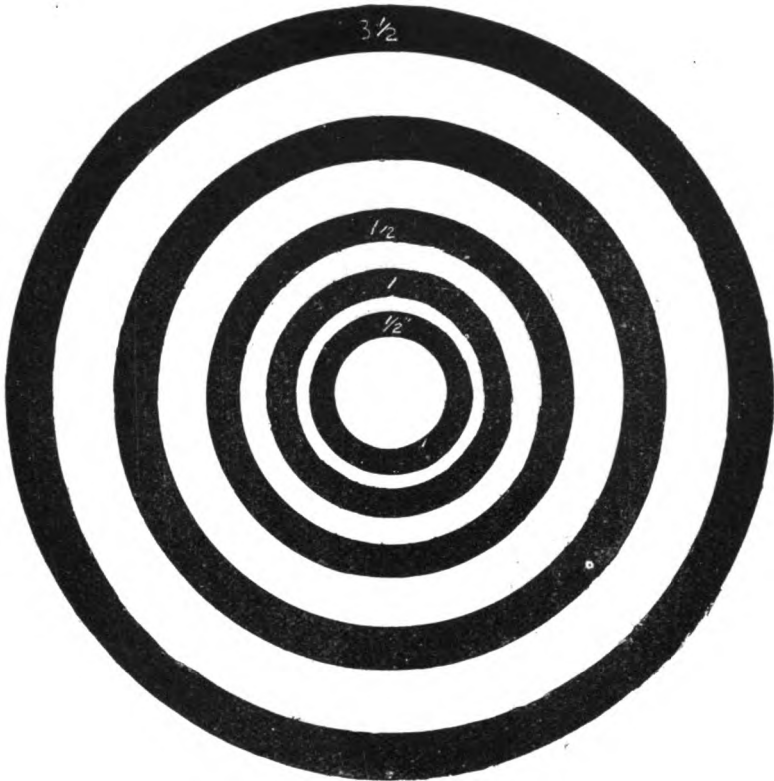
Outside Diameter Inches.	Thickness Inches.	Thickness nearest B.W.G.	Nominal Weight per Foot.	Outside Diameter Inches.	Thickness Inches.	Thickness nearest B.W.G.	Nominal Weight per Foot.	Outside Diameter Inches.	Thickness Inches.	Thickness nearest B.W.G.	Nominal Weight per Foot.
1	.005	13	1.00	3 1/2	.120	11	4.28	11	.220	5	25.00
1 1/4	.005	13	1.15	3 3/4	.120	11	4.60	12	.220	4 1/2	28.50
1 1/2	.005	13	1.40	4	.134	10	5.47	13	.238	4	32.00
1 3/4	.005	13	1.66	4 1/2	.134	10	6.17	14	.248	3 1/2	36.00
2	.005	13	1.91	5	.148	9	7.58	15	.250	3	40.00
2 1/4	.005	13	2.16	6	.165	8	10.16	16	.270	2 1/2	45.00
2 1/2	.100	12	2.75	7	.165	8	11.00	18	.300	2	50.00
2 3/4	.100	12	3.04	8	.165	8	13.65	20	.312	1 1/2	55.00
3	.100	12	3.33	9	.180	7	16.76	22	.344	1 1/4	78.50
3 1/4	.120	11	3.96	10	.203	6	21.00	24	.375	1 1/8	93.00

MERCHANT PIPE.

FIGURE 501.

MERCHANT PIPE
FOR
STEAM, GAS AND WATER.

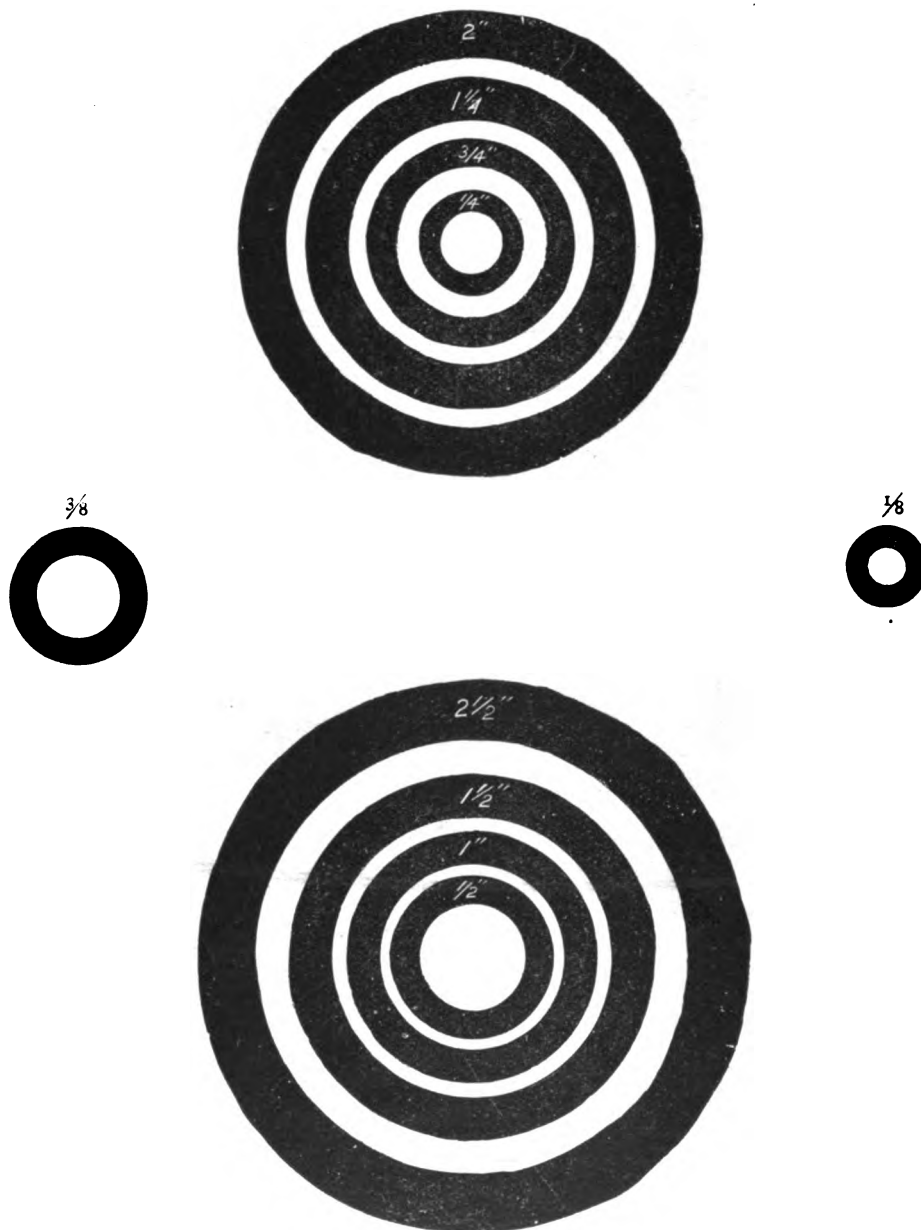
Size, Nominal Inside Diameter.	Thickness.	Nominal Weight per foot.	No. of Threads per inch of Screw.
Inches.	Inches.	Pounds.	
1/8	.068	0.24	27
1/4	.088	0.42	18
3/8	.091	0.56	18
1/2	.109	0.84	14
3/4	.113	1.12	14
1	.134	1.67	11 1/2
1 1/4	.140	2.24	11 1/2
1 1/2	.145	2.68	11 1/2
2	.154	3.61	11 1/2
2 1/2	.204	5.74	8
3	.217	7.54	8
3 1/2	.226	9.00	8
4	.237	10.66	8
4 1/2	.246	12.34	8
5	.259	14.50	8
6	.280	18.76	8
7	.301	23.27	8
8	.322	28.18	8
9	.344	33.70	8
10	.366	40.06	8
11	.375	45.00	8
12	.375	49.00	8
13	.375	54.00	8
14	.375	58.00	8
15	.375	62.00	8



Showing the inside and outside diameters.

MERCHANT PIPE, EXTRA STRONG.

FIGURE 503.



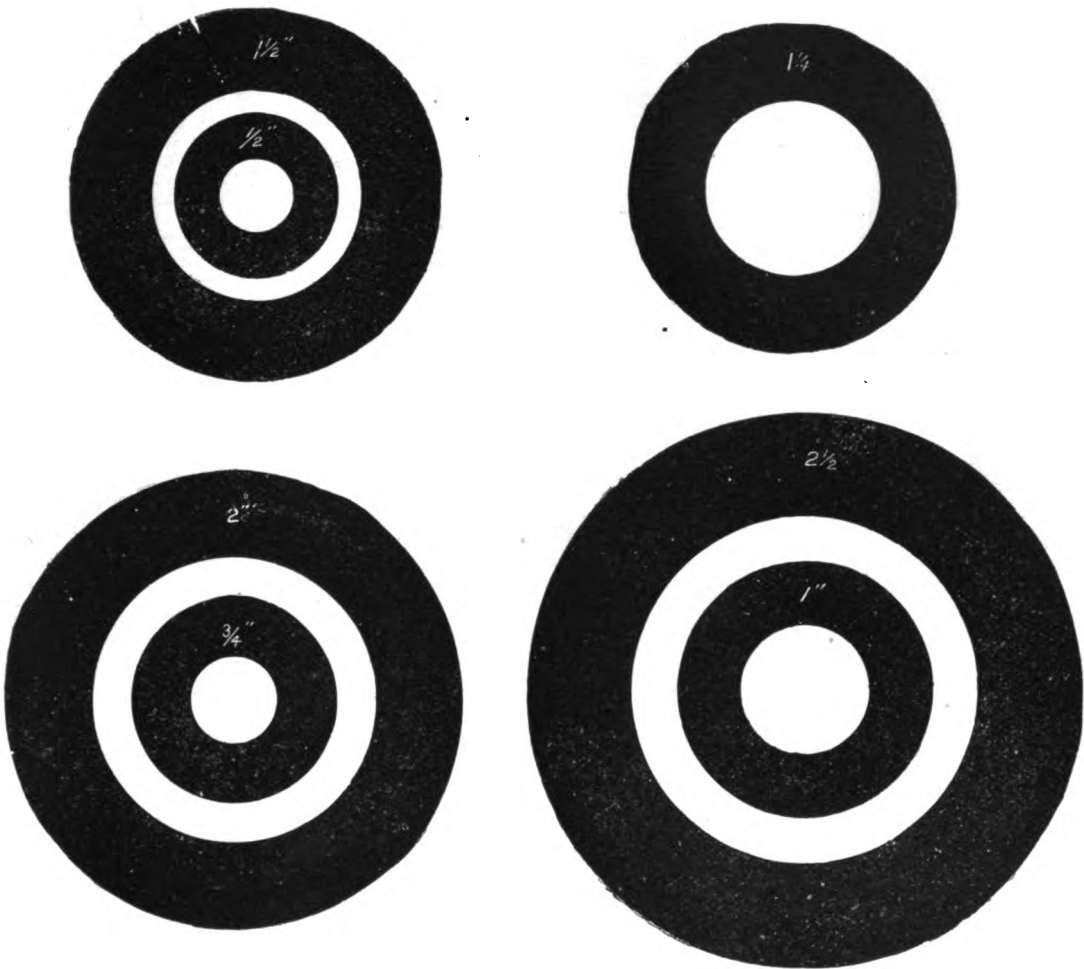
Showing the inside and outside diameters.

SIZES.

SIZE.	Actual Outside Diameter.	Actual Inside Diameter.	Thickness.	Nominal Weight Per Foot.	SIZE.	Actual Outside Diameter.	Actual Inside Diameter.	Thickness.	Nominal Weight Per Foot.
X STRONG.					X STRONG.				
1/8	.405	.205	.100	.20	2	2.375	1.933	.221	5.02
1/4	.54	.294	.123	.54	2 1/2	2.875	2.315	.280	7.67
3/8	.675	.421	.127	.74	3	3.50	2.892	.304	10.25
1/2	.84	.542	.149	1.06	3 1/2	4.00	3.358	.321	12.47
3/4	1.05	.736	.157	1.53	4	4.5	3.818	.341	14.97
1	1.315	.951	.182	2.17	5	5.563	4.813	.375	20.54
1 1/4	1.66	1.272	.194	3.00	6	6.625	5.750	.437	28.58
1 1/2	1.90	1.494	.203	3.63	7	7.625	6.620	.500	37.60
					8	8.625	7.500	.560	47.85

MERCHANT PIPE, DOUBLE EXTRA STRONG.

FIGURE 504.



Showing inside and outside diameter.

HYDRAULIC PIPE.

FIGURE 504 1/2.



TO ORDER.

SIZES OF DOUBLE EXTRA STRONG PIPE.

Size.	Inside Diameter.	Thickness.	Nominal Weight Per Foot.	Size.	Inside Diameter.	Thickness.	Nominal Weight Per Foot.
Inches.	Inches.	Inches.	Pounds.	Inches.	Inches.	Inches.	Pounds.
3/4	.23	.22	.96	3	2.284	.608	18.56
1/2	.244	.298	1.70	3 1/2	2.716	.642	22.75
1/4	.422	.314	2.44	4	3.136	.682	27.48
1	.587	.364	3.65	4 1/2	3.56	.720	32.45
1 1/4	.885	.388	5.20	5	4.063	.750	38.12
1 1/2	1.088	.406	6.40	6	4.875	.780	53.11
2	1.491	.442	9.02	7	5.980	.825	60.34
2 1/2	1.755	.560	13.68	8	6.880	.875	71.52

FITTINGS.

ELBOW.

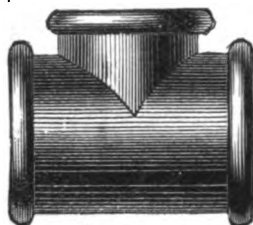
FIGURE 505.



Malleable.

TEE.

FIGURE 506.



Malleable.

CROSS.

FIGURE 507.



Malleable.

45° ELBOW.

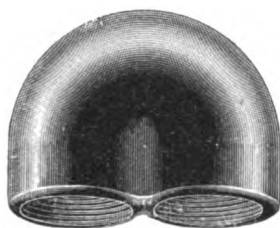
FIGURE 508.



Malleable.

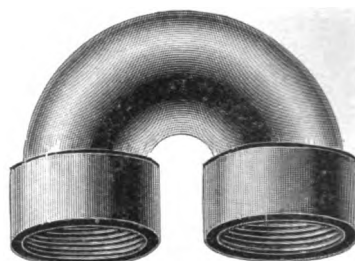
RETURN BENDS.

FIGURE 509.



(Close.)

FIGURE 509 A.



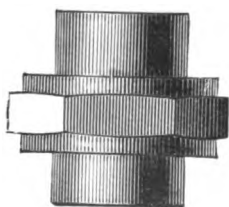
Malleable.

(Open.)

MALLEABLE LIP UNIONS.

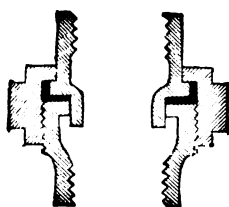
COMMON.

FIGURE 510.



SECTIONAL.

FIGURE 510 AA.



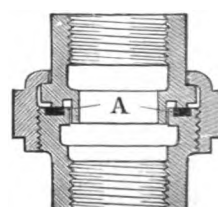
AMERICAN.

FIGURE 510 A.



SECTIONAL.

FIGURE 510 B.



This Union requires no packing, the bed of anti-corrosive metal at A serves in its place. It cannot burn or rot out, or be blown out.

FLANGE UNIONS.

HEAVY, WITH GASKET.

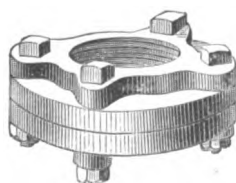
FIGURE 511.



Cast Iron.

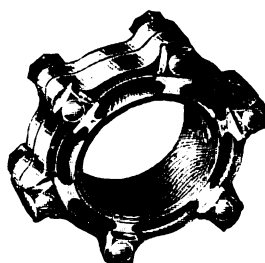
REGULAR.

FIGURE 511 A.



Cast Iron.

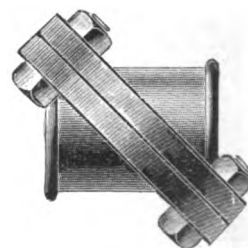
FIGURE 512.



Malleable.

CUSHING'S PATENT.

FIGURE 513.

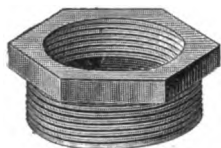


With this, two pipes can be united so as to form a straight line, or any angle up to a right angle.

FITTINGS.

BUSHINGS.

FIGURE 514.



With Squares.

FIGURE 514 A.



Flush.

COMMON.

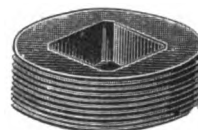
FIGURE 515.



PLUGS.

SOCKET.

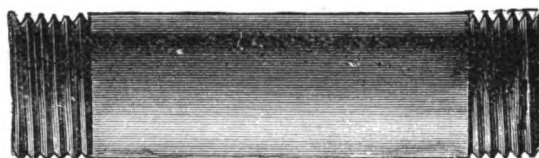
FIGURE 515 A.



NIPPLES.

LONG.

FIGURE 516 A.



SHOULDER.

FIGURE 516.



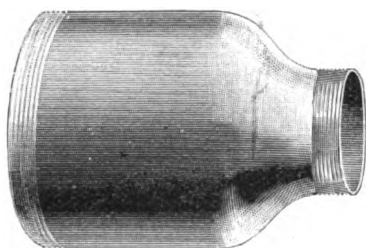
CLOSE.

FIGURE 516 B.



SWEDGE NIPPLE.

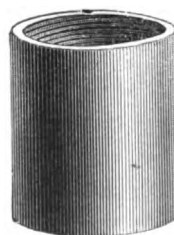
FIGURE 516 C.



Made of Pipe.

COUPLING.

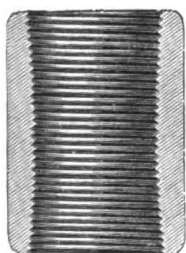
FIGURE 517.



Wrought Iron.

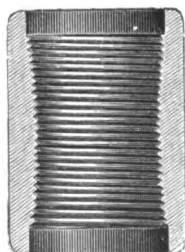
COUPLINGS FOR CASING, DRIVE PIPE, LINE PIPE AND TUBING

FIGURE 517 A.



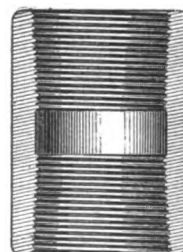
Without Sleeve.

FIGURE 517 B.



With Sleeve.

FIGURE 517 C.



Morse Patent.

REDUCERS.

FIGURE 518.



Cast Iron.

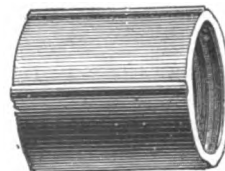
FIGURE 519



Malleable.

COUPLING.

FIGURE 520.



Right and Left.

FITTINGS.

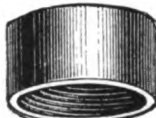
CAPS.

FIGURE 521.



Cast Iron.

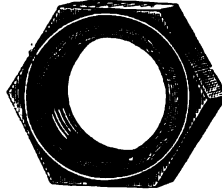
FIGURE 522.



Malleable Iron.

LOCK NUTS.

FIGURE 523.



Cast Iron.

FIGURE 524.



Malleable Iron.

OLD STYLE.

FIGURE 525.

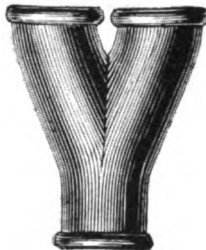


Malleable Iron.

Y'S.

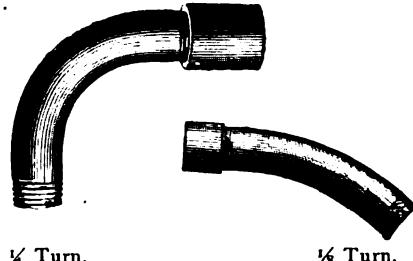
NEW STYLE.

FIGURE 526.



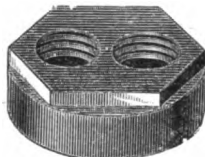
PIPE BENDS.

FIGURE 527.



TWO HOLE CAP.

FIGURE 528.



Cast.

TWO HOLE BUSHING.

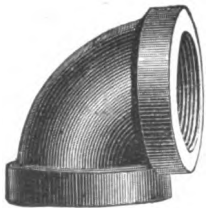
FIGURE 529.



Cast.

ELBOW.

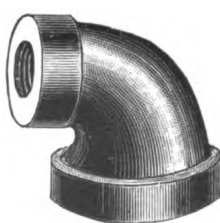
FIGURE 530.



Cast.

REDUCING ELBOW.

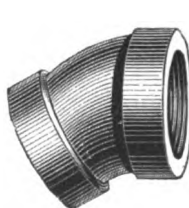
FIGURE 530 A.



Cast.

45° ELBOW.

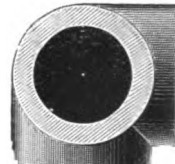
FIGURE 530 B.



Cast.

ELBOW WITH
SIDE OUTLET.

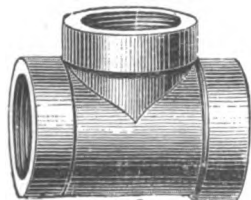
FIGURE 530 C.



Cast.

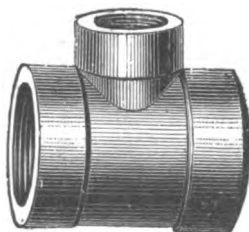
TEE.

FIGURE 531.



Cast.

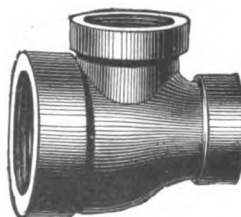
FIGURE 531 A.



Cast.

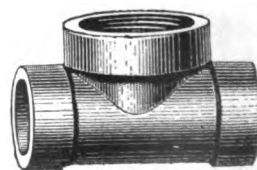
REDUCING TEES.

FIGURE 531 B.



Cast.

FIGURE 531 C.

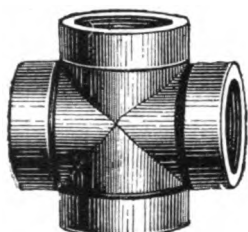


Cast.

FITTINGS.

CROSS.

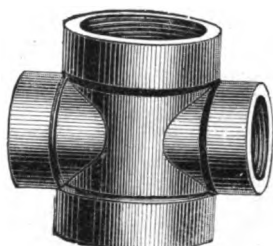
FIGURE 532.



Cast.

REDUCING CROSS.

FIGURE 532 A.



Cast.

Y.

FIGURE 532 B.

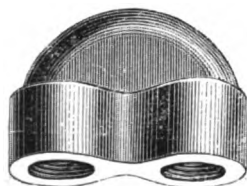


Cast.

RETURN BENDS.

CLOSE.

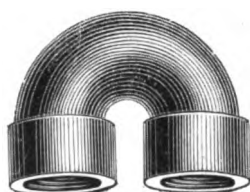
FIGURE 532 C.



Cast.

OPEN.

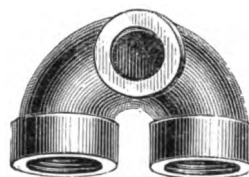
FIGURE 532 D.



Cast.

WITH SIDE OUTLET.

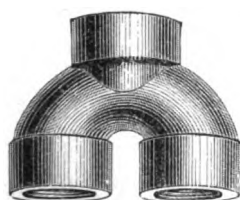
FIGURE 532 E.



Cast.

WITH BACK OUTLET.

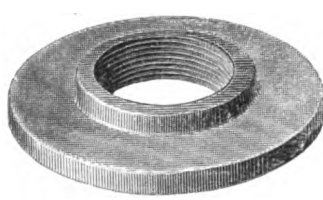
FIGURE 532 F.



Cast.

COMMON FLANGE.

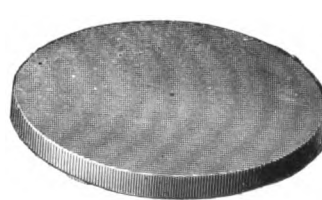
FIGURE 532 G.



Cast.

BLANK FLANGE.

FIGURE 532 H.



Cast.

FLOOR FLANGE.

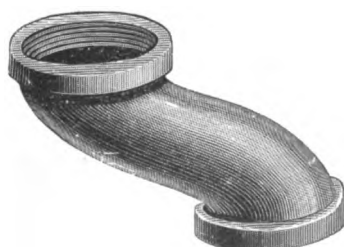
FIGURE 532 I.



Cast.

OFFSET.

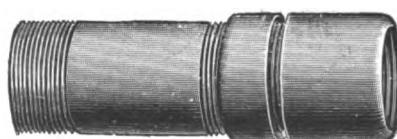
FIGURE 532 J.



Cast.

LONG SCREW.

FIGURE 532 K.



Made of Pipe.

EXTRA HEAVY CAST IRON FITTINGS

FOR

NATURAL GAS, HYDRAULIC PRESSURES, &c., WITH OR WITHOUT LIP FOR LEAD.

ELBOW.

FIGURE 533.



TEE.

FIGURE 534.



CROSS.

FIGURE 535.



45 DEGREE ELBOWS.

PLAIN.

FIGURE 536.



LIP FOR LEAD.

FIGURE 536 A.

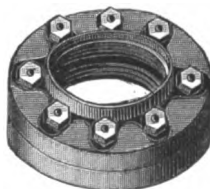


Y.

FIGURE 537.

FLANGE UNION WITH
RUBBER OR LEAD GASKET.

FIGURE 538.



PLUG.

FIGURE 539.



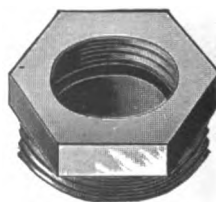
DOUBLE Y.

FIGURE 537 A.



BUSHING.

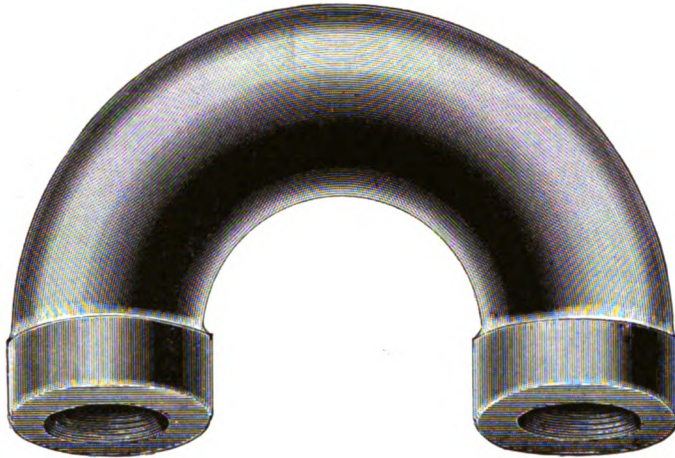
FIGURE 540.



CAST IRON FITTINGS.

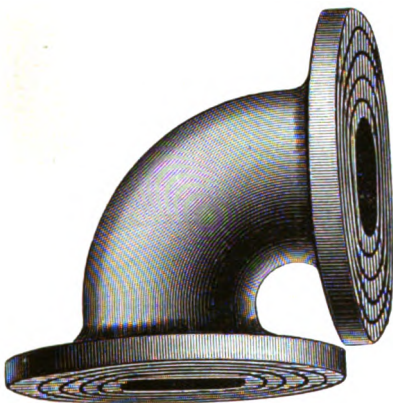
EXTRA HEAVY RETURN BEND FOR ICE MACHINES.

FIGURE 544.



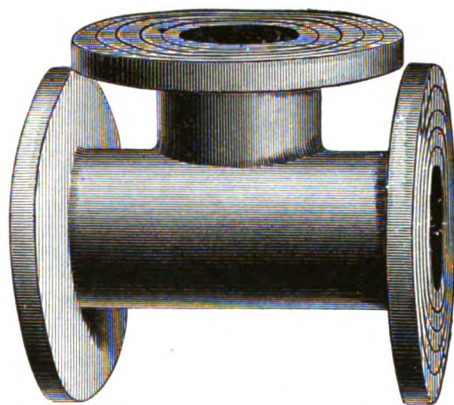
FLANGED ELBOW.

FIGURE 545.



FLANGED TEE.

FIGURE 545 A.



LONG TURN FITTINGS.

ELBOW.

FIGURE 546.



TEE.

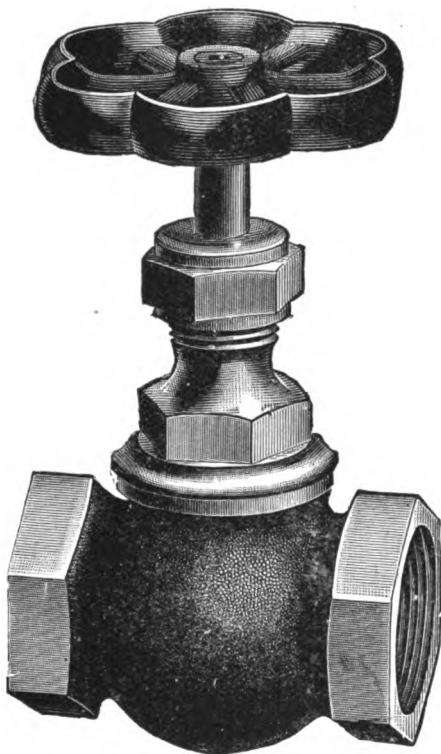
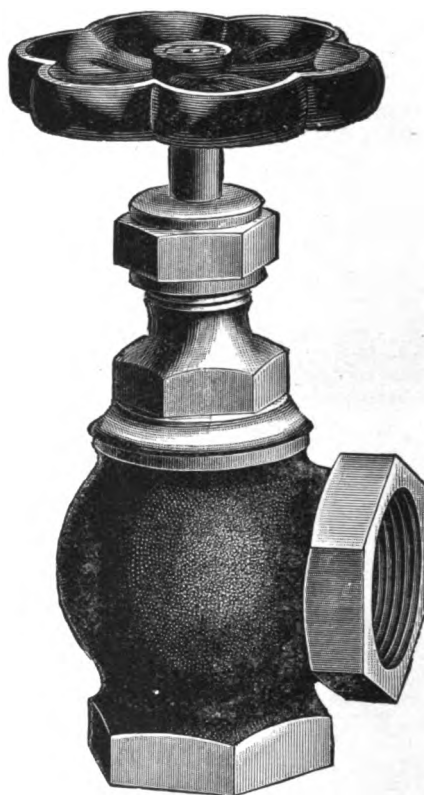
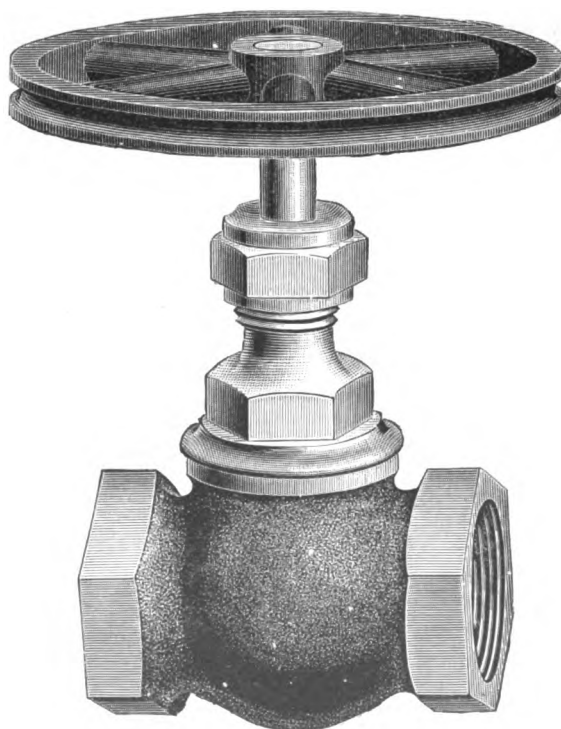
FIGURE 546 A.

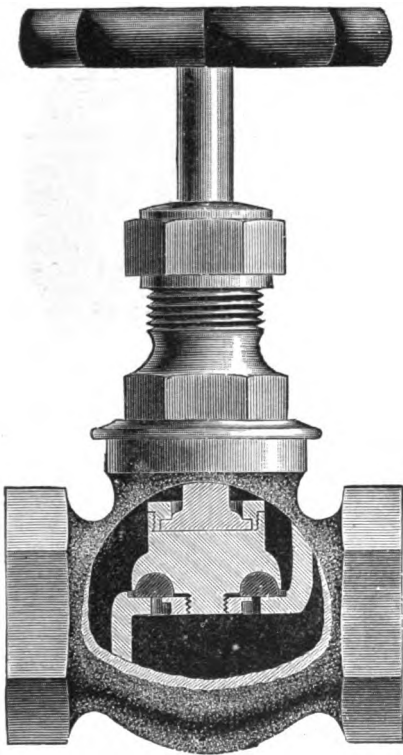
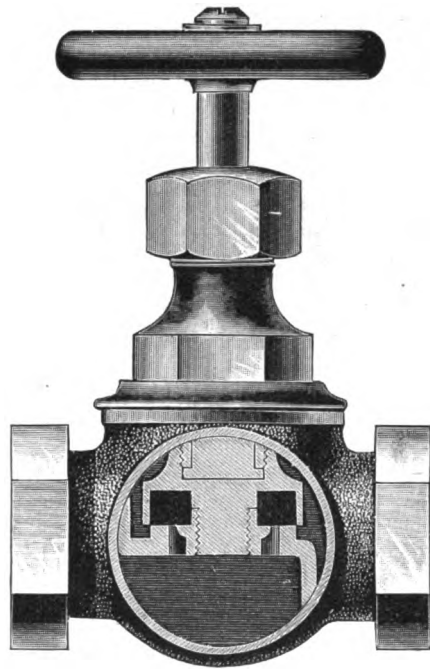


TEE.

FIGURE 546 B.



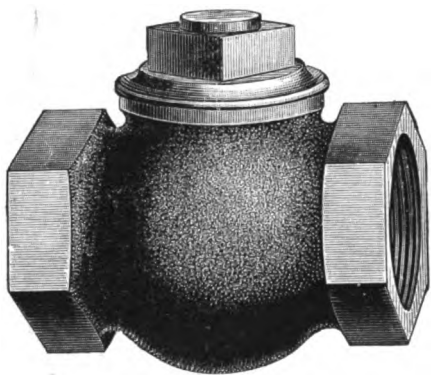
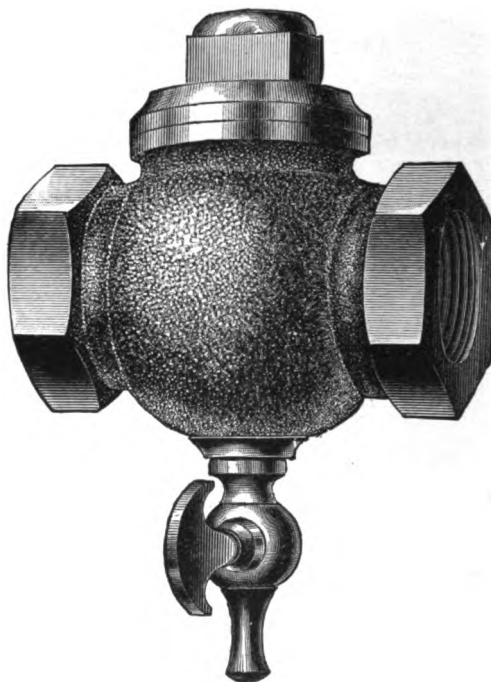
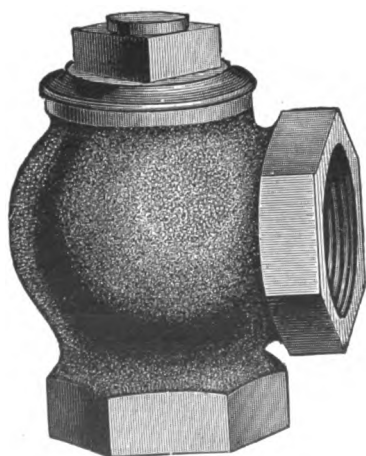
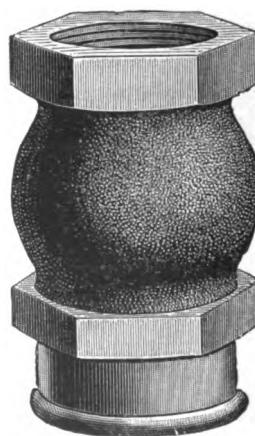
BRASS GOODS.**GLOBE VALVE.****FIGURE 550.****ANGLE VALVE.****FIGURE 550 A.****GLOBE VALVE WITH GROOVED WHEEL.****FIGURE 551.**

BRASS GOODS.**FRINK'S PATENT GLOBE VALVE.****FIGURE 552.****JENKINS PATENT GLOBE VALVE.****FIGURE 552 A.**

These valves have loose composition discs which come in contact with the flat seat of the valves, and there is just enough elasticity in the discs to cover any foreign substance that may be on the seat, consequently the valve is tight under almost any conditions. The disc is a small round washer and can easily be replaced.

These discs have been in use a great many years, so that their practicability has been thoroughly demonstrated. They will stand any pressure of steam, oils, acids or gases, and will remain tight under any of them. As there is no regrinding or turning of the seats or discs, the valve is practicably indestructible.

The discs are kept in stock.

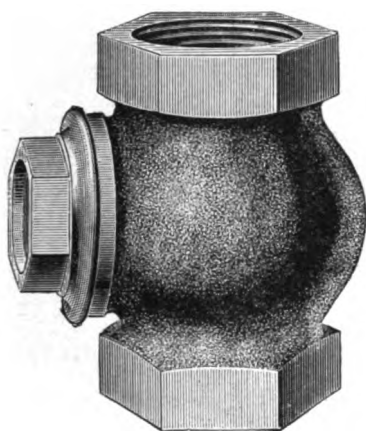
BRASS GOODS.**CHECK VALVES.****HORIZONTAL.****FIGURE 553.****WITH DRIP COCK.****FIGURE 553 A.****ANGLE.****FIGURE 553 B.****VERTICAL.****FIGURE 554.**

BRASS GOODS.

CHECK VALVES.

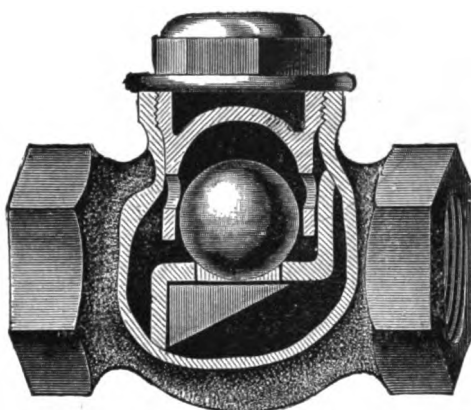
VERTICAL, CAP AT SIDE.

FIGURE 555.



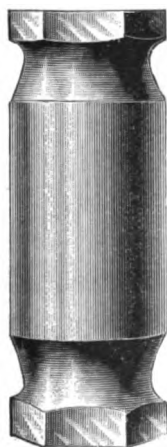
HORIZONTAL BALL CHECK.

FIGURE 556.



VERTICAL BALL CHECK.

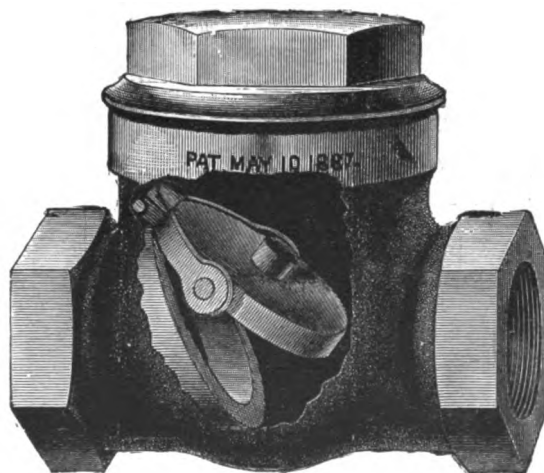
FIGURE 557.



STRAIGHT-WAY CHECK.

"NEARY'S PATENT."

FIGURE 558.

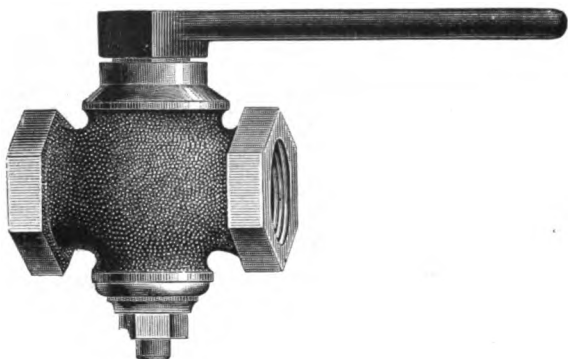


BRASS GOODS.

STEAM COCKS.

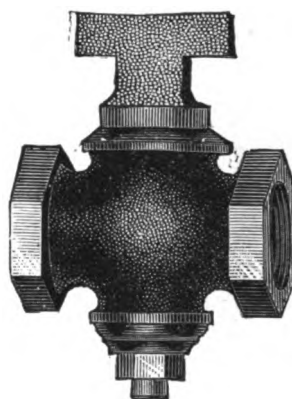
LEVER HANDLE.

FIGURE 565.



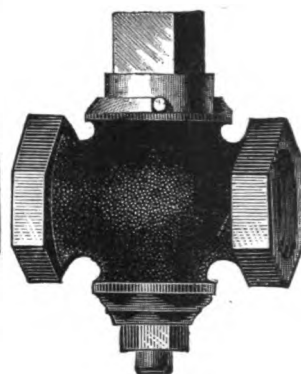
T HANDLE.

FIGURE 565 A.



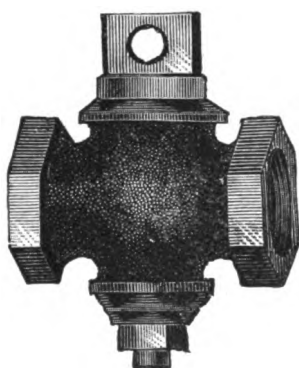
STOP ON KEY.

FIGURE 565 B.



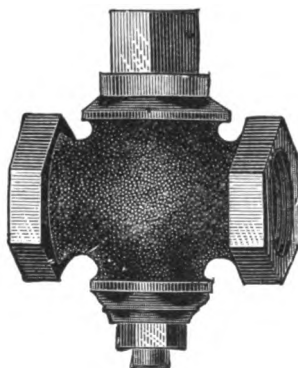
FLAT HEAD.

FIGURE 566.



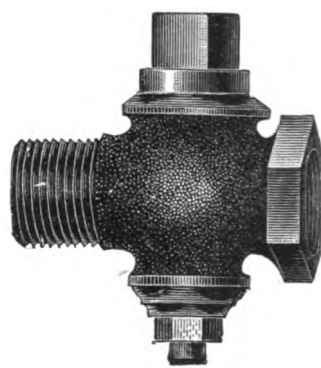
SQUARE HEAD.

FIGURE 566 A.



MALE AND FEMALE.

FIGURE 566 B.

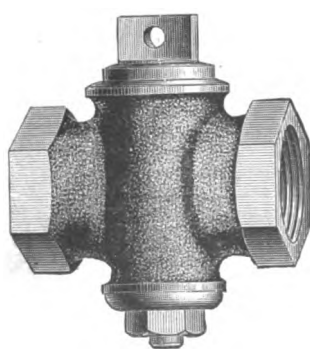


Flat or Square Head

GAS COCKS

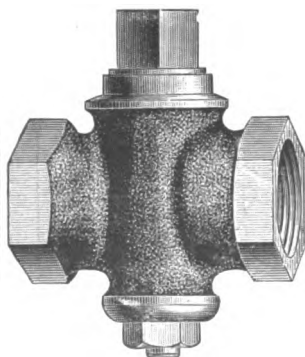
FLAT HEAD.

FIGURE 567.



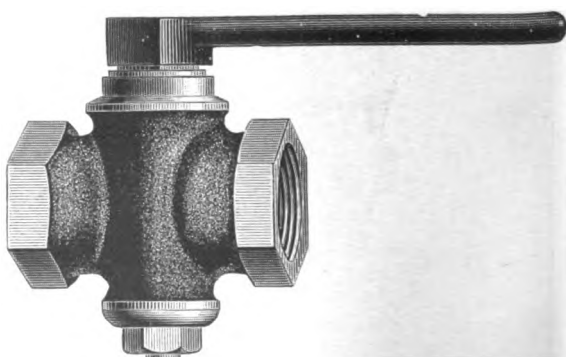
SQUARE HEAD.

FIGURE 567 A.



LEVER HANDLE.

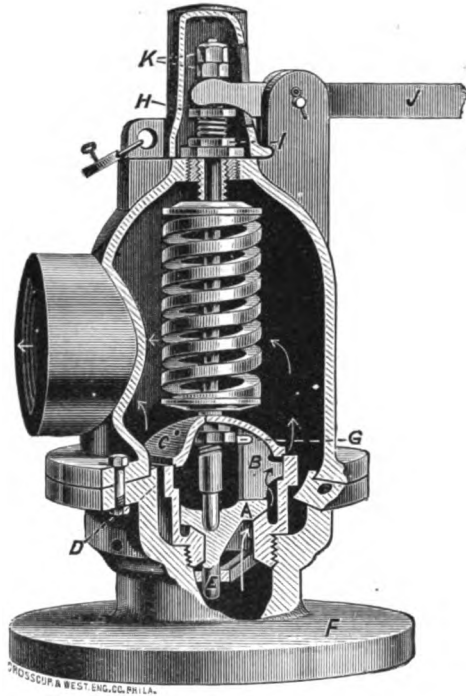
FIGURE 568.



SAFETY VALVE, &c.

POP SAFETY VALVE.

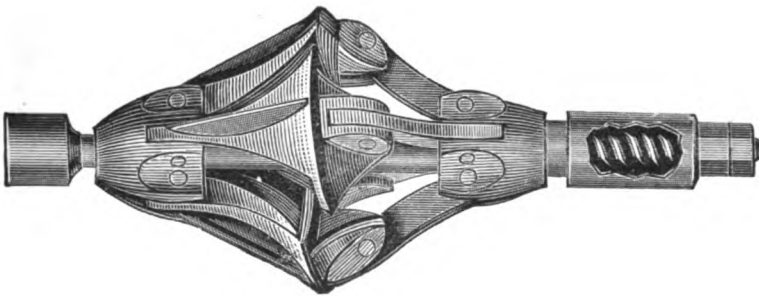
FIGURE 569 C.



All smaller than 2 inch Screwed at Base. 2 and 2½ inch Screwed or Flanged.
All sizes above 2½ inch are Flanged at Base.

INGALL'S SELF ADJUSTING FLUE SCRAPER.

FIGURE 785 E.



All Sizes.

SPIRAL TUBE BRUSH.

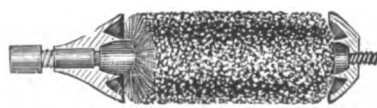
FIGURE 785 F.



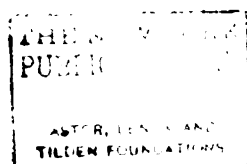
All sizes to 4 inches, either Wire or Whalebone.

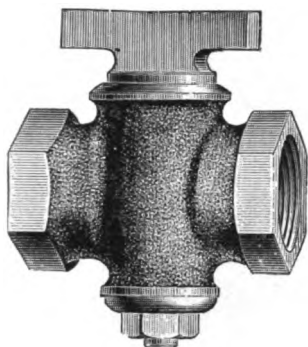
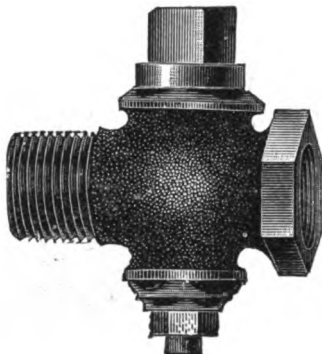
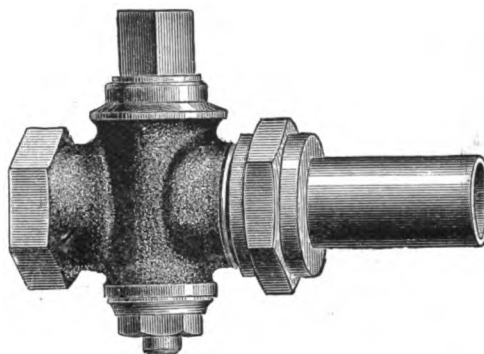
ABRAHAM'S TUBE BRUSH.

FIGURE 785 G.



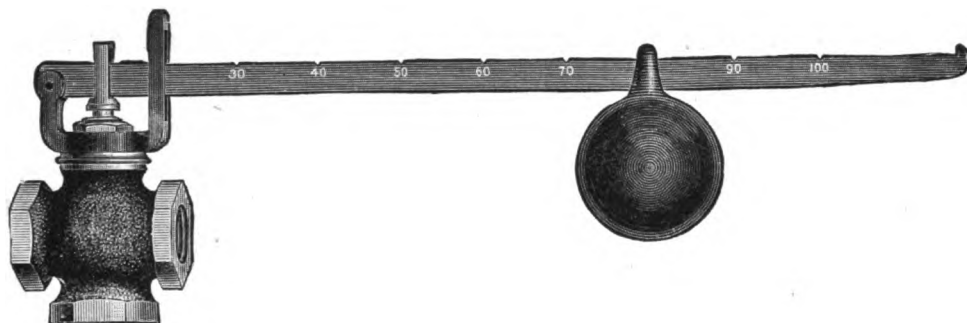
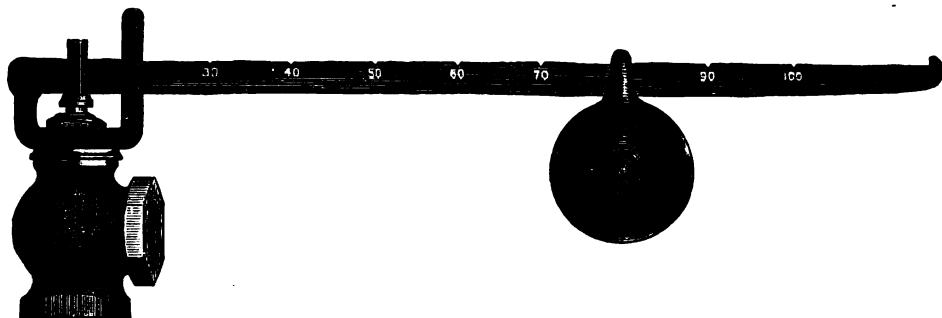
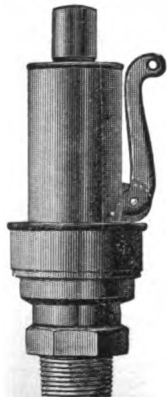
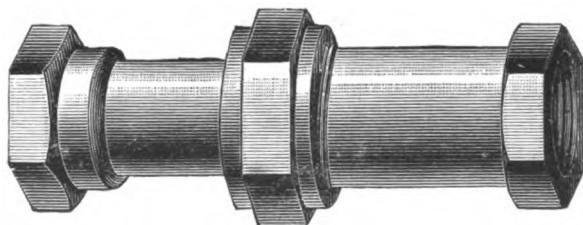
All sizes, 4 inch to 6 inch.



BRASS GOODS.**GAS COCKS.****T HANDLE.****FIGURE 568 A.****MALE AND FEMALE.****FIGURE 568 B.****UNION METER COCK.****FIGURE 568 C.**

Flat or Square Heads.

Flat or Square Heads. Lever or T Handle.

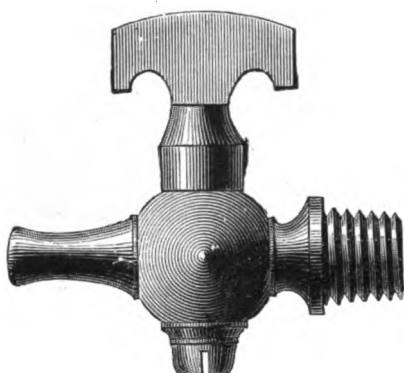
GLOBE SAFETY VALVE.**FIGURE 569.****ANGLE SAFETY VALVE.****FIGURE 569 A.****POP SAFETY VALVE.****FIGURE 569 B.****EXPANSION JOINT.****FIGURE 570.**

BRASS GOODS.

AIR COCKS.

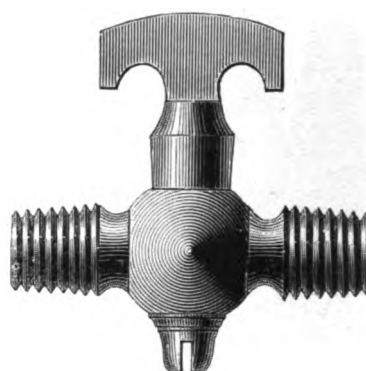
SINGLE THREAD.

FIGURE 580.



DOUBLE THREAD.

FIGURE 581.

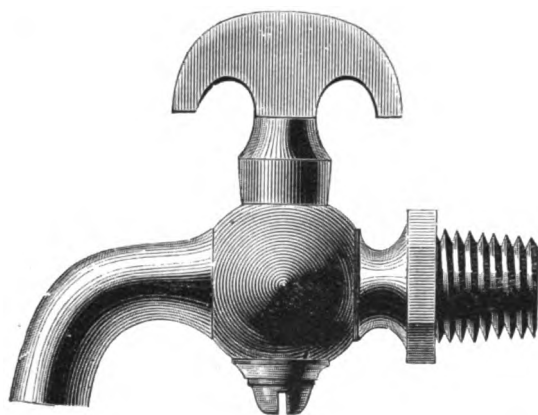


$\frac{1}{4}$ Inch
Full Sizes.

BIBB AIR COCKS.

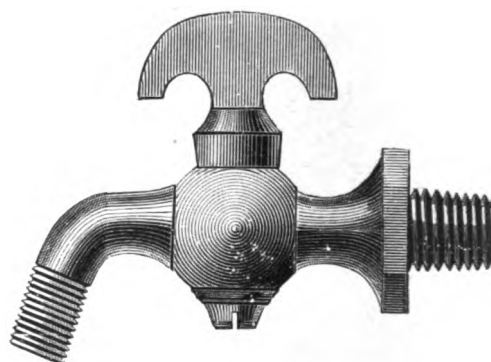
SINGLE THREAD.

FIGURE 583.



DOUBLE THREAD.

FIGURE 584.

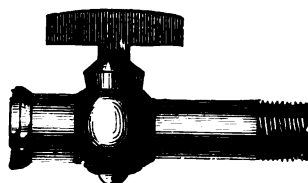


$\frac{1}{4}$ Inch
Full Sizes.

STEAM GAUGE COCKS.

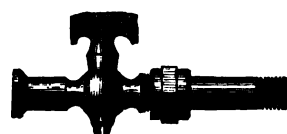
T HANDLE.

FIGURE 585.



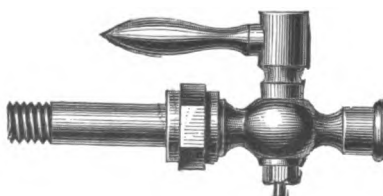
T. HANDLE WITH UNION.

FIGURE 585 A.



LEVER HANDLE WITH UNION

FIGURE 585 B.



BRASS GOODS.

PLAIN OIL CUP.

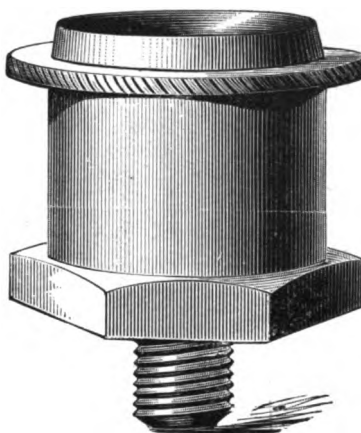
FIGURE 595.



Exact size of No. 4.

NEW PATTERN OIL CUP.

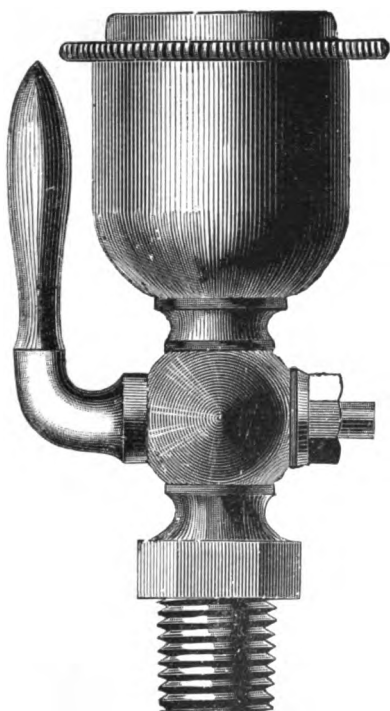
FIGURE 600.



Exact size of No. 4

LEVER HANDLE OIL CUP.

FIGURE 602.



Exact size of No. 2.

OIL CUP WITH COCK.

FIGURE 605.



BRASS GOODS.

GLASS OIL CUPS.

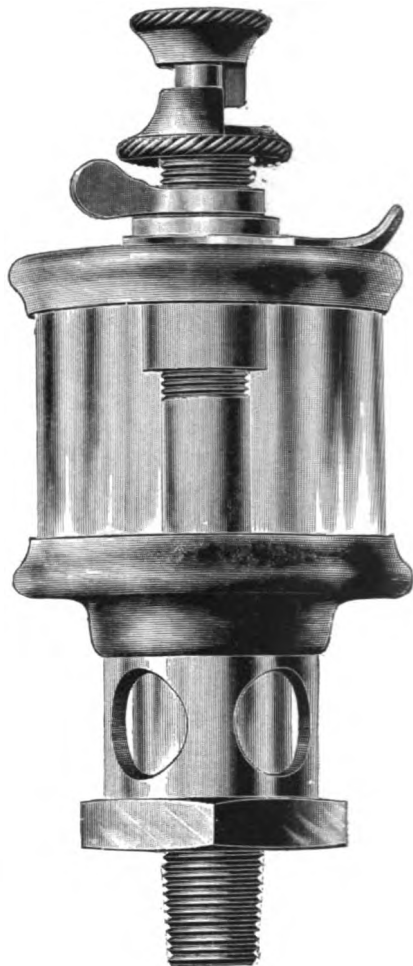
PLAIN.

FIGURE 605 A.



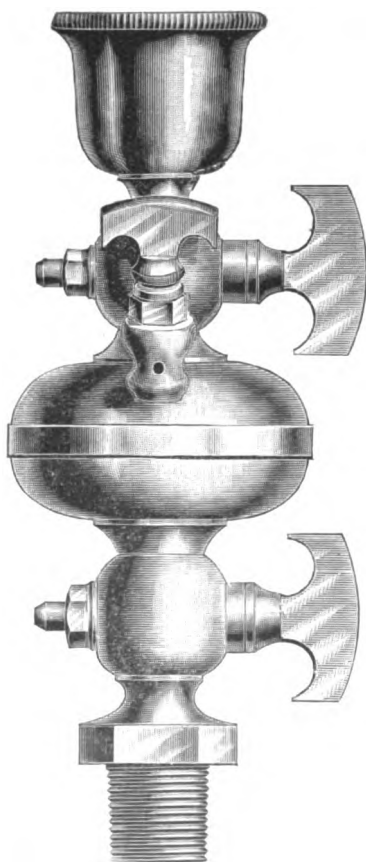
SIGHT FEED.

FIGURE 605 B.



GLOBE OIL CUP.

FIGURE 606.

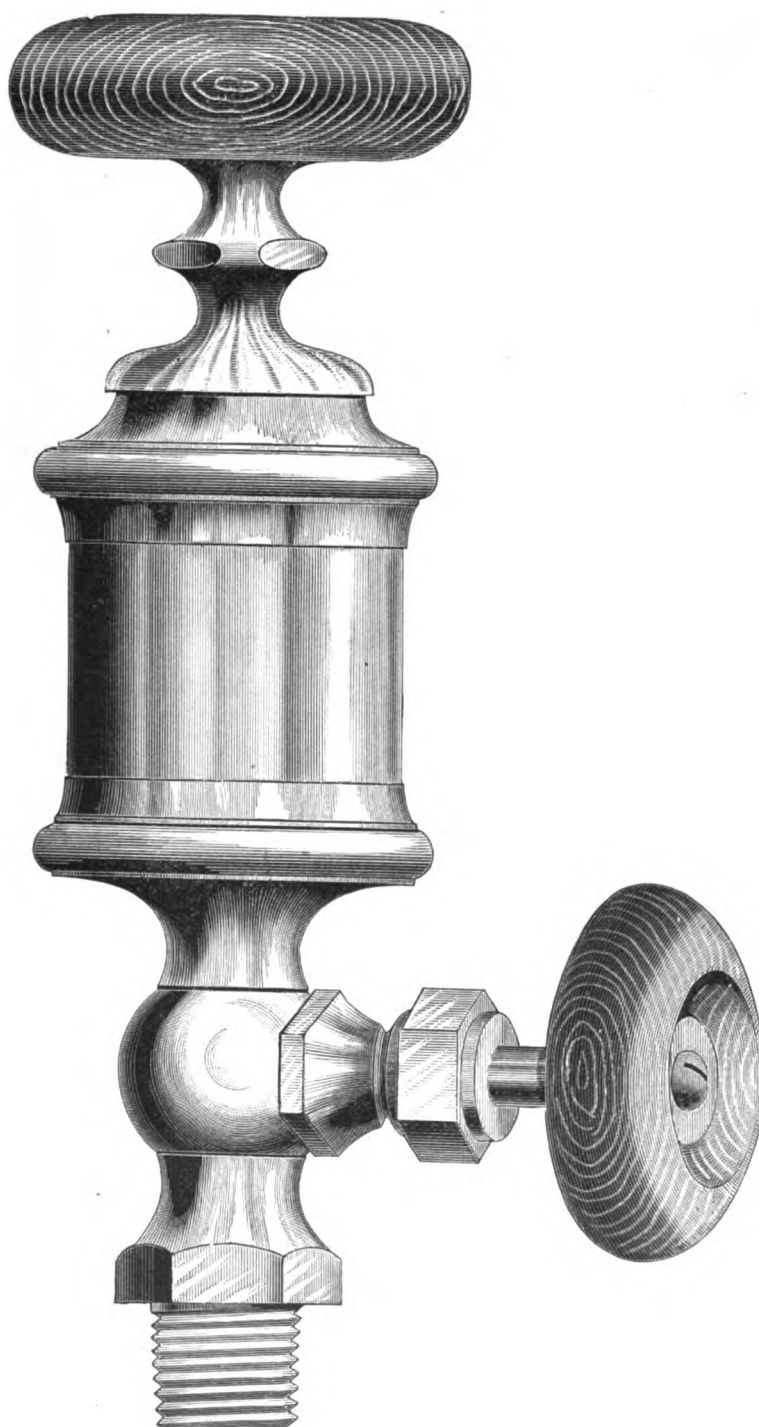


BRASS GOODS.

COMMON LUBRICATOR.

EXACT SIZE OF No. 5.

FIGURE 610.



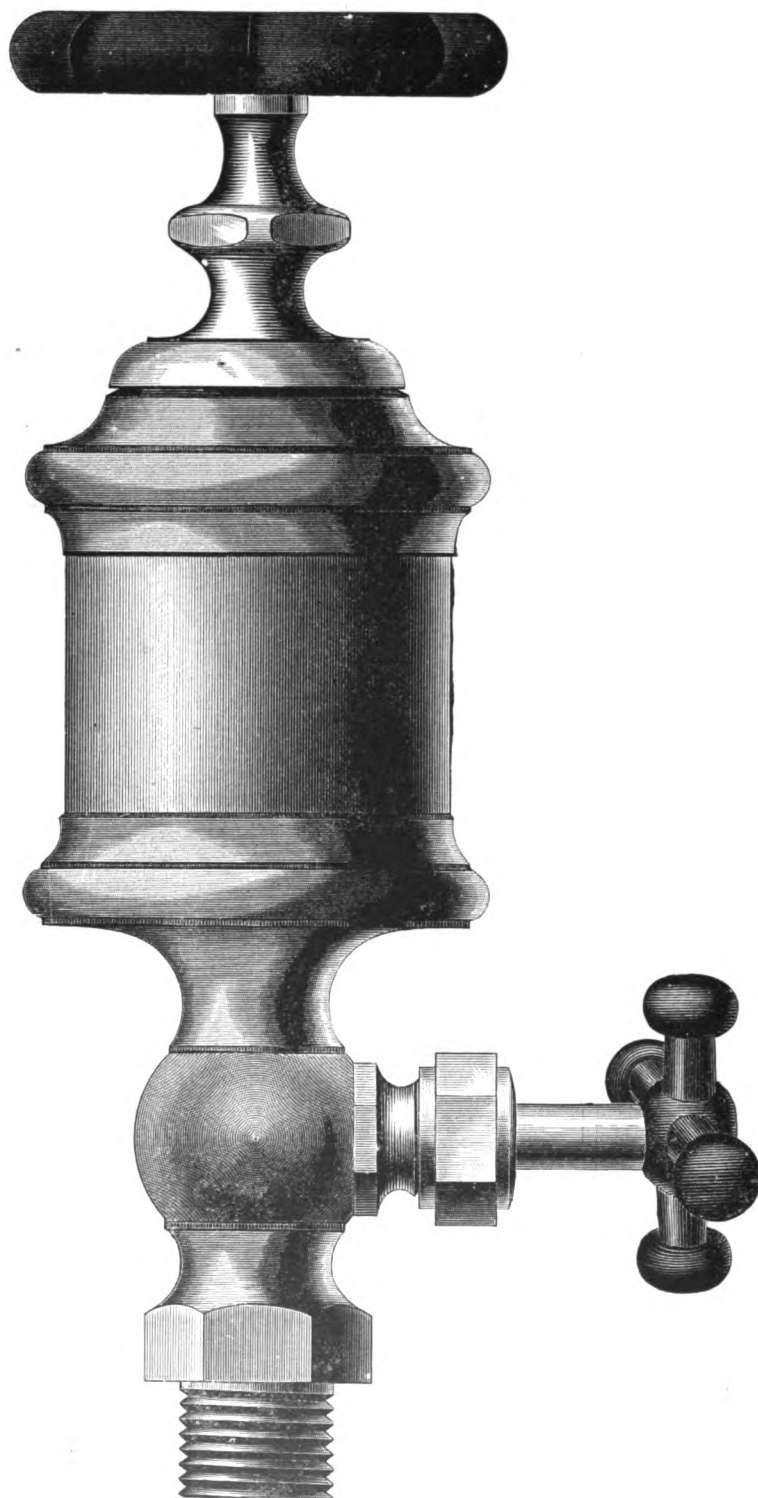
Wood Handles.

BRASS GOODS.

IRON BODY LUBRICATOR.

FULL SIZE.

FIGURE 612.

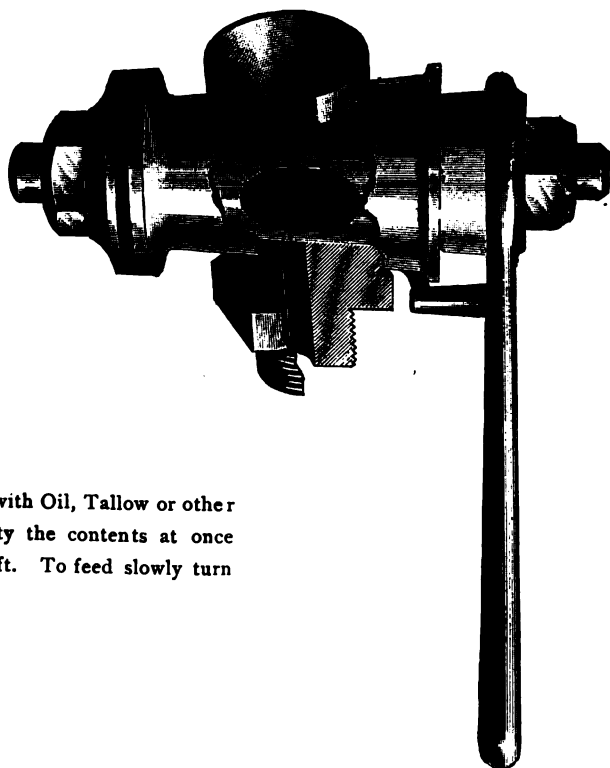


Iron Handles.

BRASS GOODS.

GUYER'S PATENT HOLLOW PLUG LUBRICATOR.

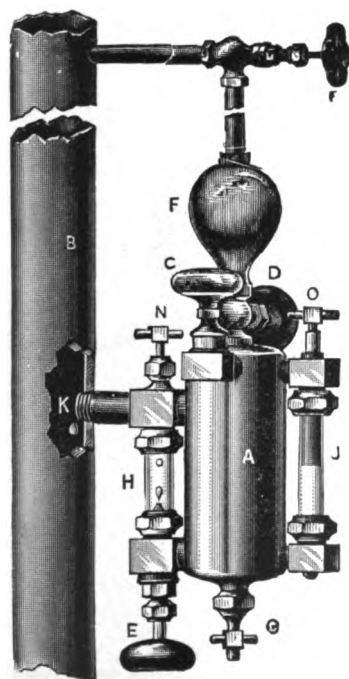
FIGURE 613.



The plug is filled with Oil, Tallow or other lubricant. To empty the contents at once turn handle to the left. To feed slowly turn handle to the right.

DETROIT SIGHT FEED LUBRICATOR.

FIGURE 614.

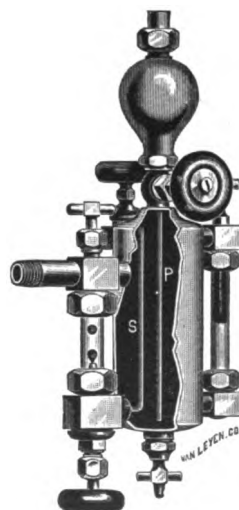


DESCRIPTION.

- A—Oil Reservoir.
- B—Steam Pipe.
- C—Oil Filler.
- D—Water Feed Valve.
- E—Valve to regulate flow of Oil.
- F—Steam Tube and condensing chamber.
- G—Drain Valve to draw off water to prevent freezing, etc.
- H—Sight-Feed Glass.
- J—Glass Indicator.
- K—Oil Discharge Pipe.
- N—Valve to correct pulsation or Unsteadiness in Feed.
- O—Vent.

NOTE— $\frac{1}{2}$ Pints have no Gauge Glass.

SECTION.

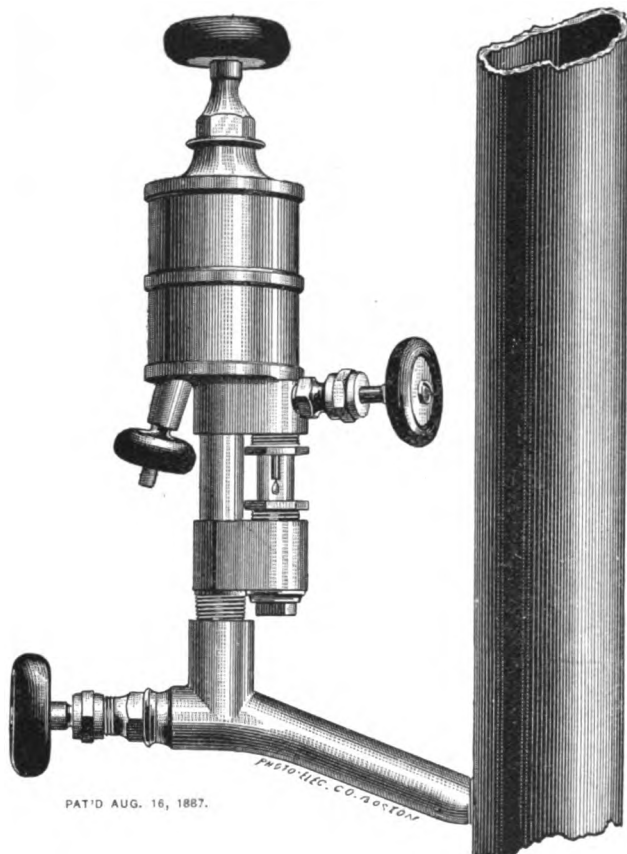


TO PREVENT FREEZING.—Valves D, G and E should be left open.

BRASS GOODS.

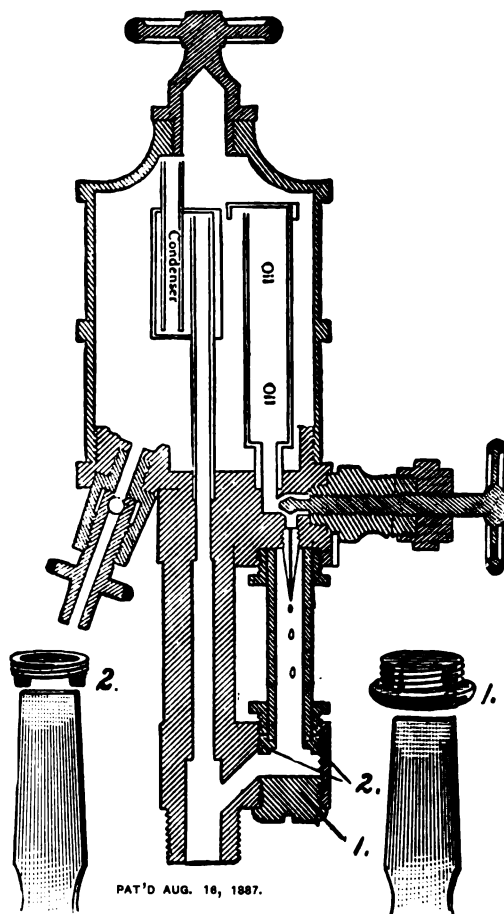
ELLIS SIGHT FEED CYLINDER OIL CUP.

FIGURE 615.



SECTIONAL VIEW.

FIGURE 615 A.



COMBINATION VALVE AND NIPPLE.

AS FURNISHED WITH THE ELLIS CYLINDER OIL CUP.

FIGURE 615 B.

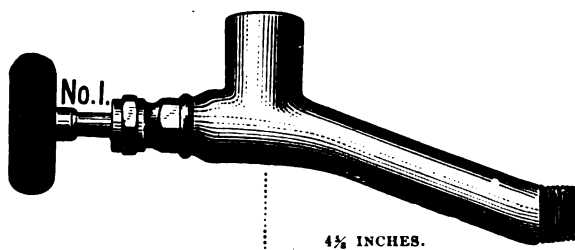


FIGURE 615 C.

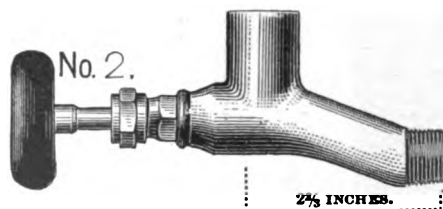
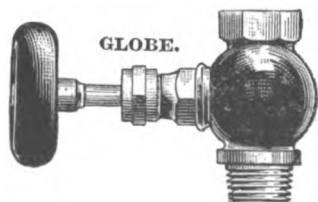


FIGURE 615 D.



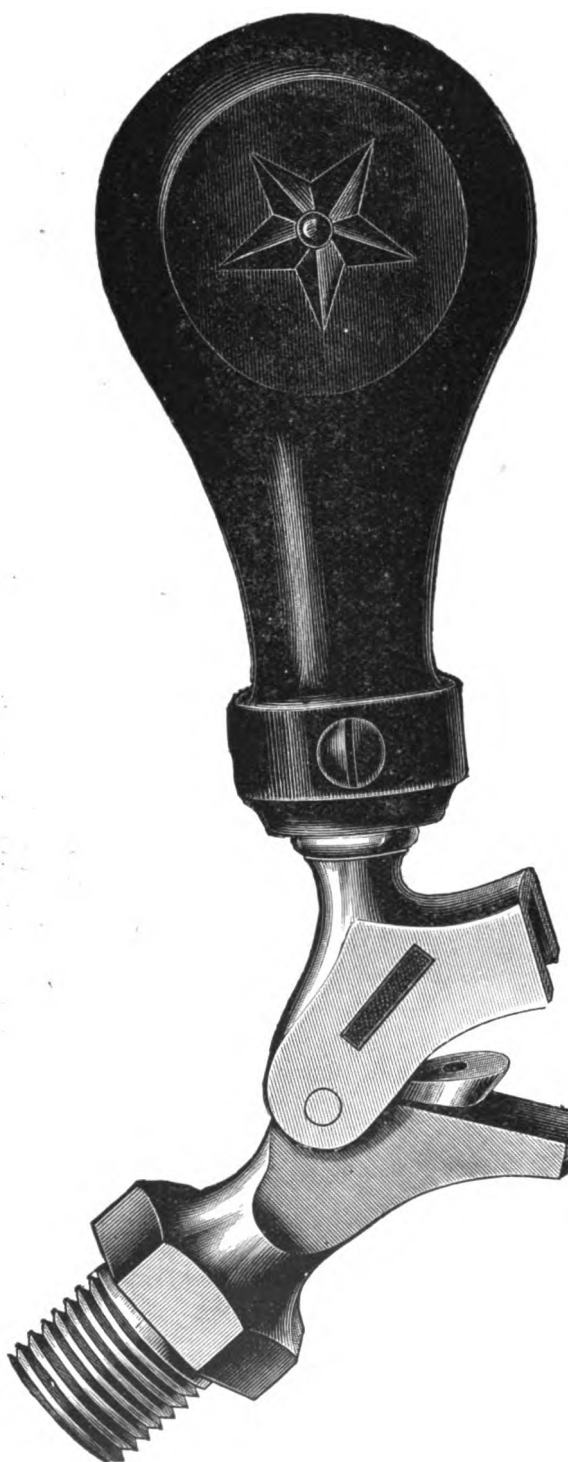
No. 1 or No. 2 is to attach to a vertical steam pipe where that length nipple is required. They are all made $\frac{1}{2}$ inch Standard Pipe Thread.

BRASS GOODS.

WEIGHTED GAUGE COCK.

"REGISTER PATTERN."

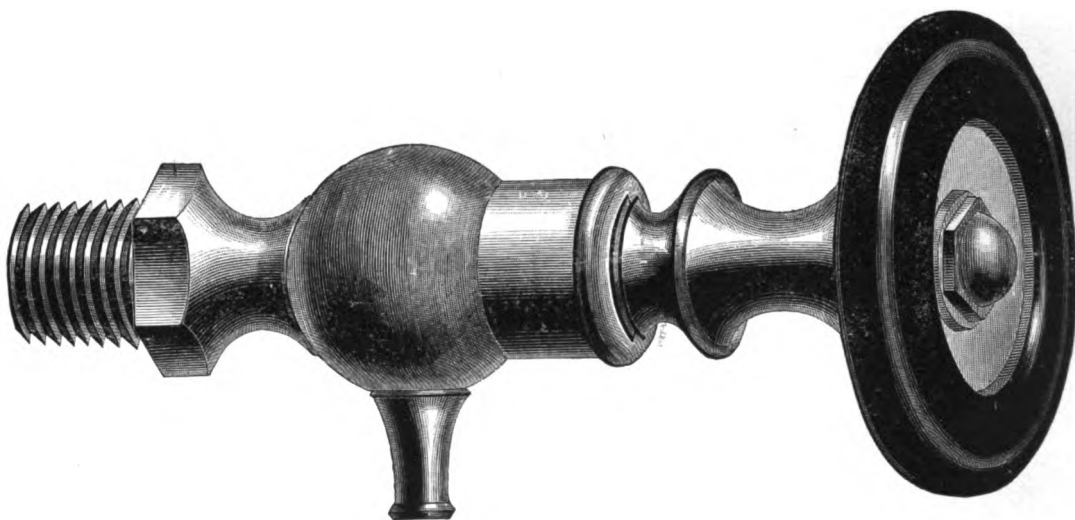
FIGURE 621.



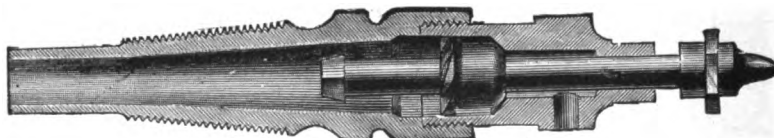
Full Size.

BRASS GOODS.**COMPRESSION GAUGE COCK.**

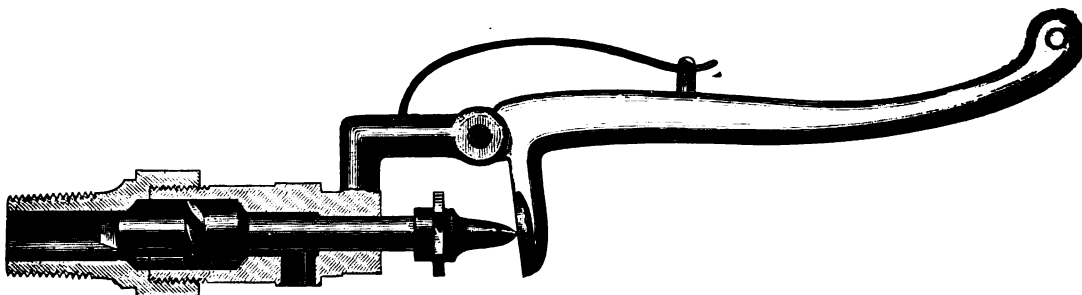
WOOD HANDLE.

FIGURE 621 A.**MISSISSIPPI GAUGE COCKS.**

"BINGHAM'S PATENT." SECTIONAL VIEW.

FIGURE 623.

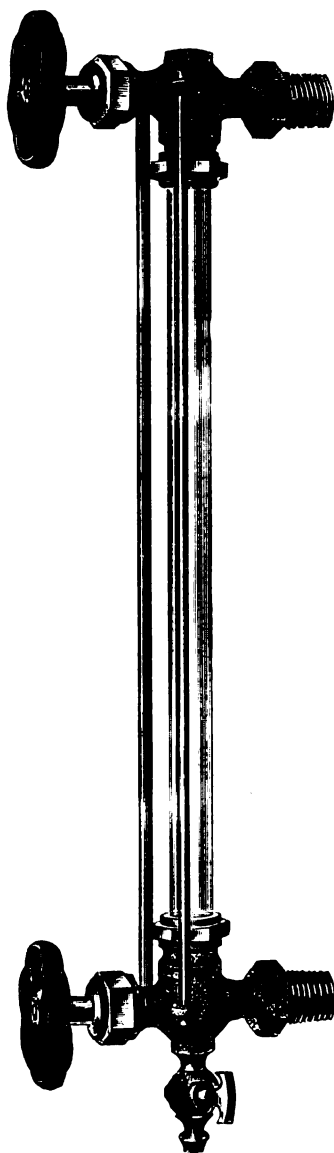
SAME WITH HANDLE.

FIGURE 624.

BRASS GOODS.

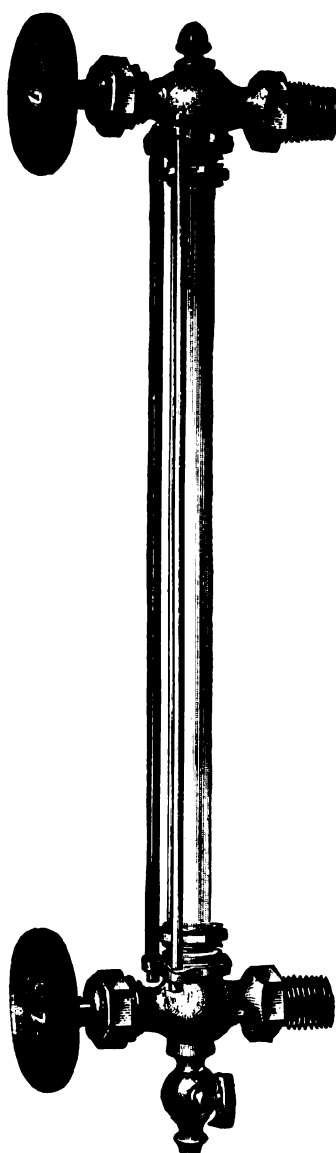
WATER GAUGES.

FIGURE 625.



No. 3¼.

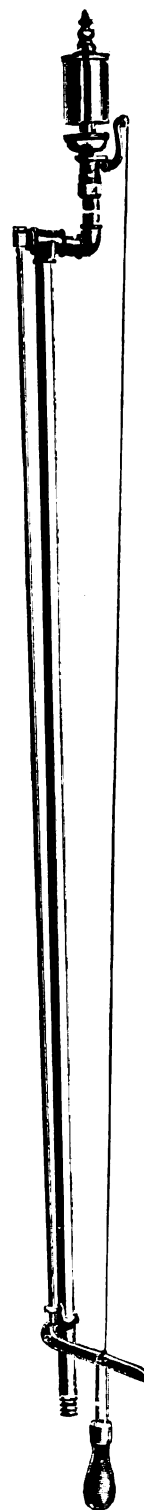
FIGURE 625 A.



No 3¼.

LOW WATER ALARM.

FIGURE 630.



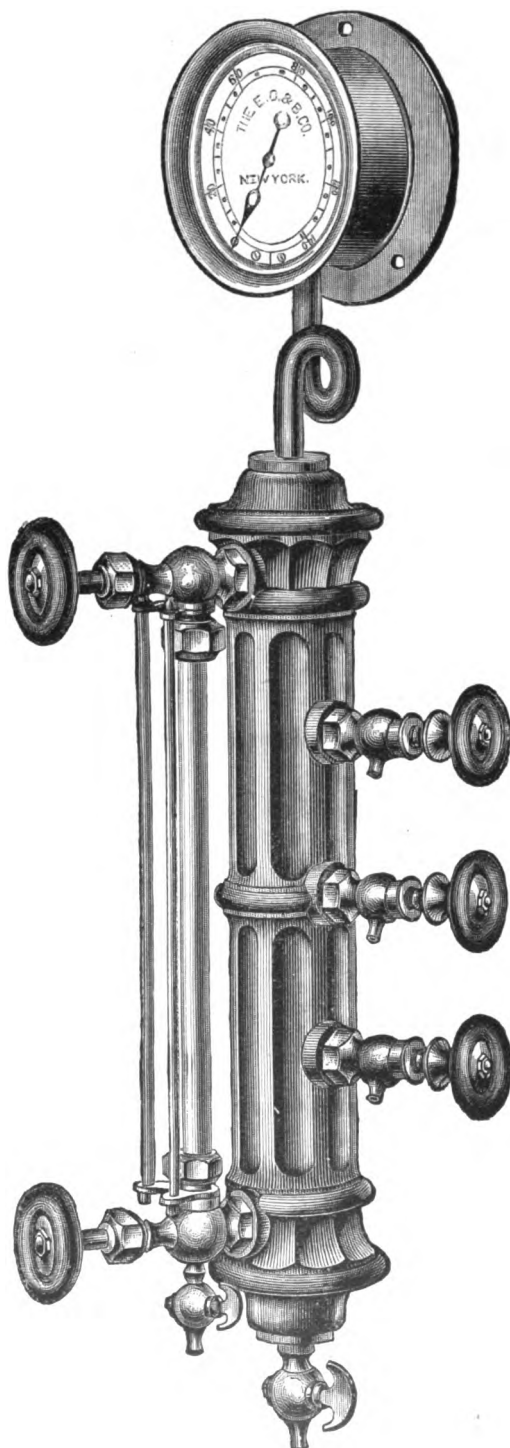
To be placed at second gauge cock hole in boiler.

When water is below that point steam enters and expands tube, which drops weight and blows the whistle.

BRASS GOODS.

COMBINATION WATER COLUMN.

FIGURE 631.



- No. 1.—Tapped for $\frac{3}{8}$ inch Gauge Cocks and $\frac{1}{2}$ inch Water Gauge.
 “ “ $\frac{3}{4}$ “ Boiler Connection.
 No. 2.—Tapped for $\frac{1}{2}$ inch Gauge Cocks and $\frac{1}{2}$ inch Water Gauge.
 “ “ 1 “ Boiler Connection.

BRASS GOODS.

STEAM WHISTLES.

FIGURE 635.

No. 1.

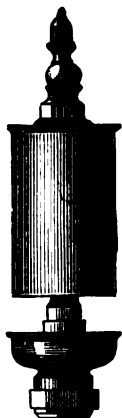


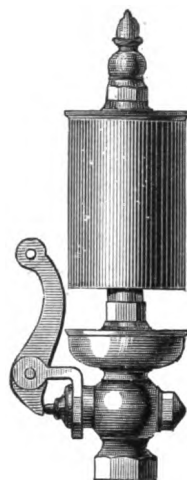
FIGURE 636.

No. 2.



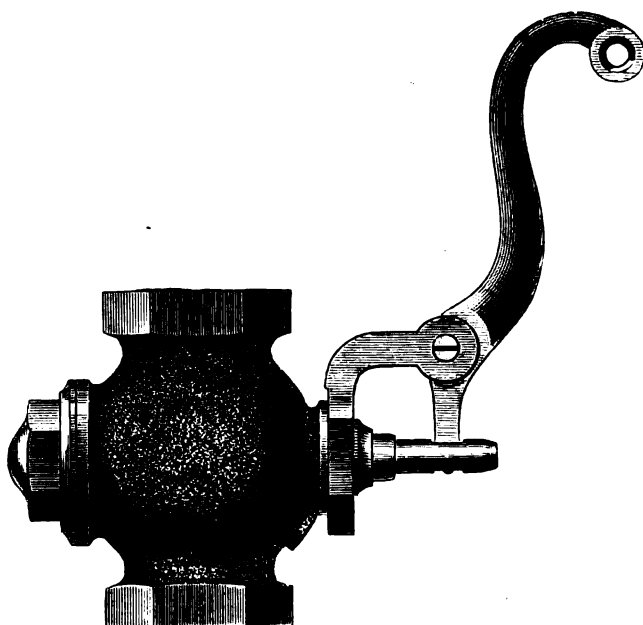
FIGURE 637.

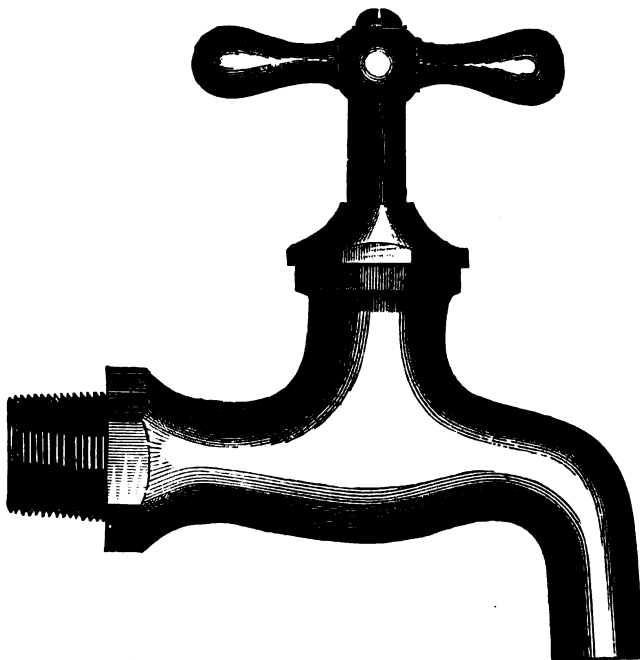
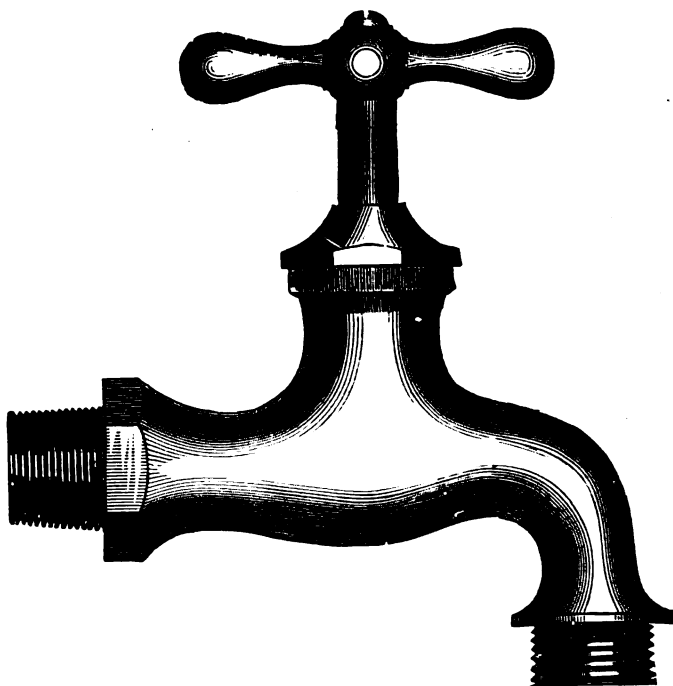
No. 3.



WHISTLE VALVE.

FIGURE 639.



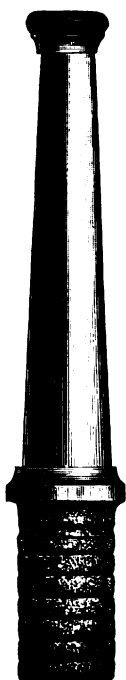
BRASS GOODS.**COMPRESSION PLAIN BIBB (THREADED, FOR IRON PIPE.)****FIGURE 645.****COMPRESSION HOSE BIBB (THREADED, FOR IRON PIPE.)****FIGURE 646.****Finished or Plated.**

BRASS GOODS.

HOSE PIPES.

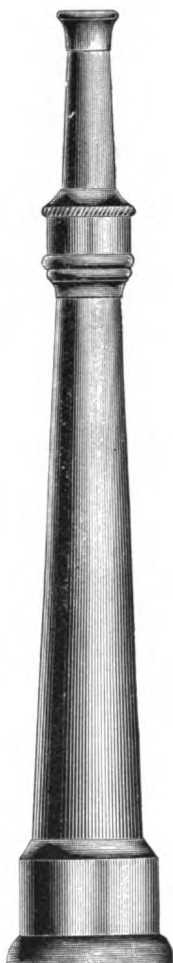
TO TIE IN.

FIGURE 659.



PLAIN, SCREW TIP.

FIGURE 660.



COCK LARGE END, SCREW TIP.

FIGURE 661.



HOSE CLAMP.

FIGURE 662.



HOSE COUPLING.

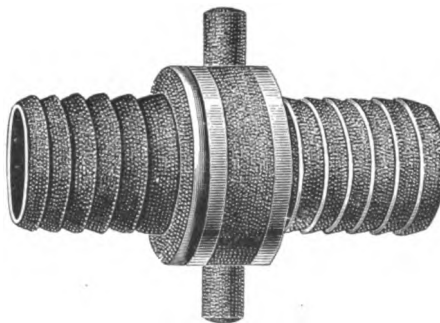
FIGURE 663.



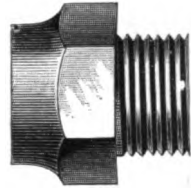
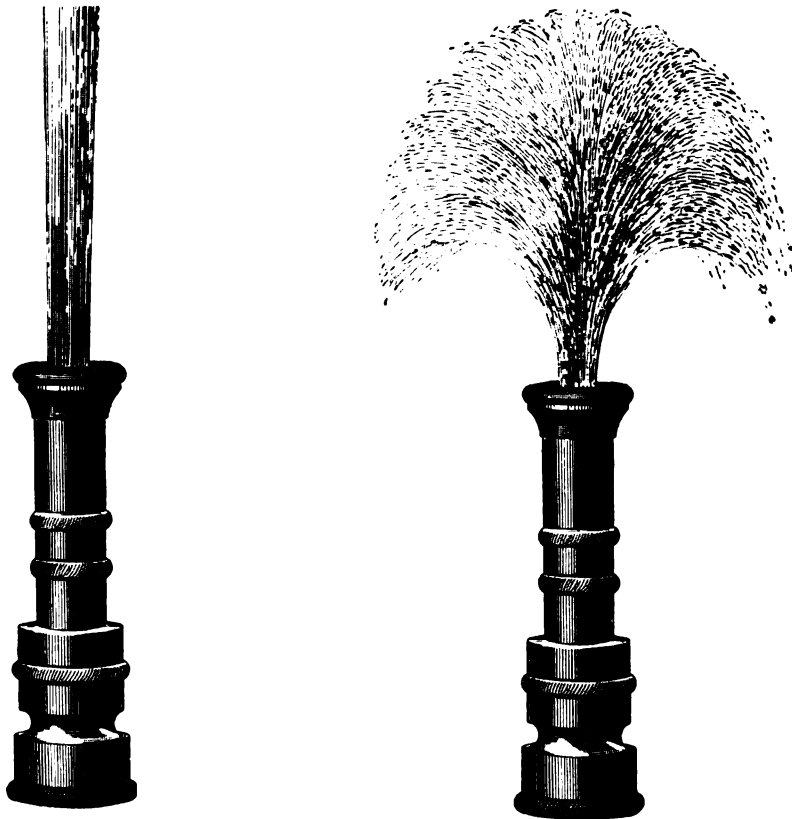
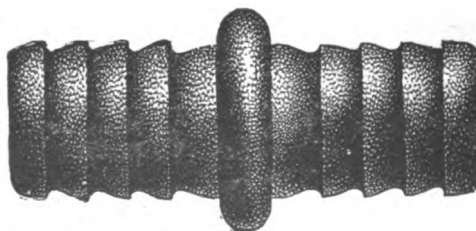
For small size Hose.

HOSE COUPLING.

FIGURE 663 A.



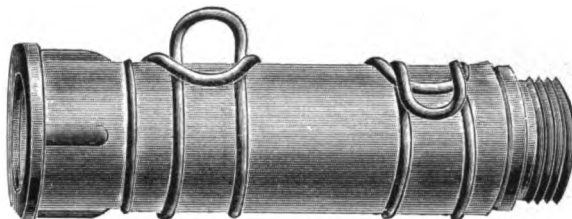
For large size Hose.

BRASS GOODS.**HOSE AND IRON PIPE NIPPLES.****FIGURE 664.****Both ends Male thread.****FIGURE 664 A.****Male and Female.****GEM HOSE NOZZLES.****FIGURE 665.****Can be changed from a solid stream to the finest spray, or the water shut off.****HOSE MENDER.****FIGURE 666.**

HOSE STRAP AND GOVERNOR.

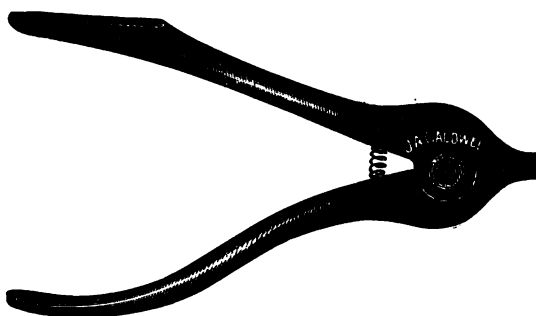
CALDWELL'S HOSE STRAP.

FIGURE 667.



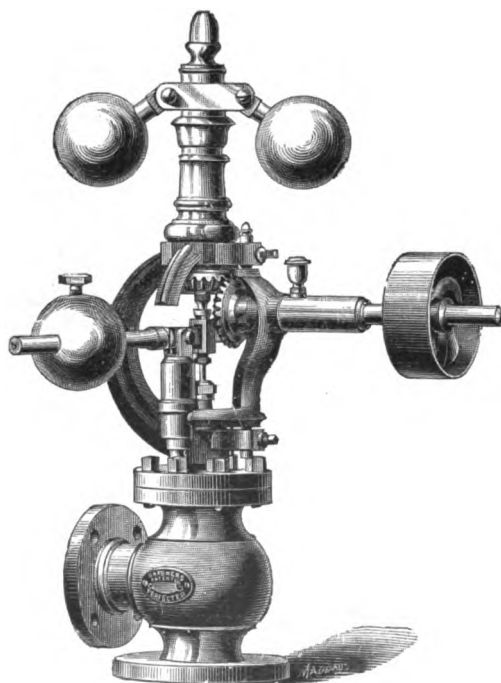
CALDWELL'S HOSE STRAP FASTENER.

FIGURE 668.



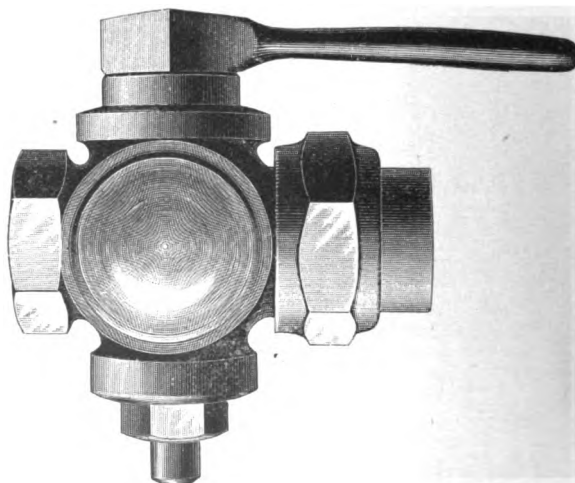
PATENT GOVERNOR, FOR ENGINES.

FIGURE 670.

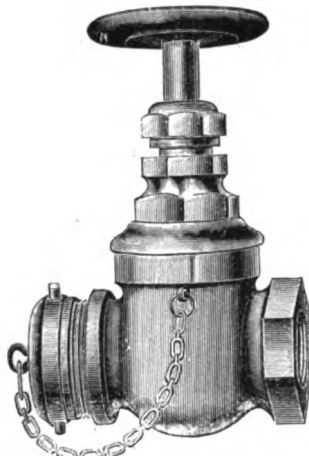


BRASS GOODS.**BLEEDERS.****SINGLE THREAD.****FIGURE 671.****DOUBLE THREAD.****FIGURE 671 A.**

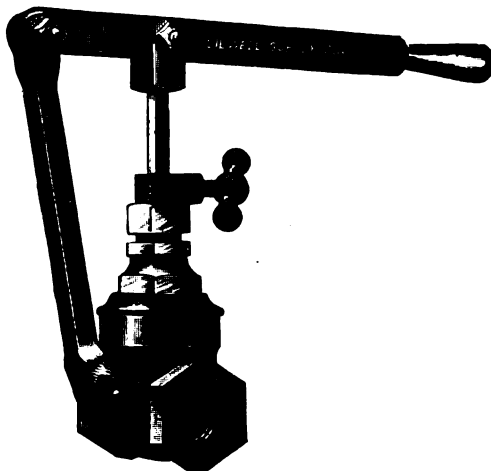
For draining steam pipes of condensed water. Automatically opens when the steam pressure is off, closed when it is on, thus draining the pipe of water but losing no steam.

COKE OVEN VALVE.**FIGURE 672.****TUYERE COCK FOR BLAST FURNACE.****FIGURE 673.**

BRASS GATE VALVES.

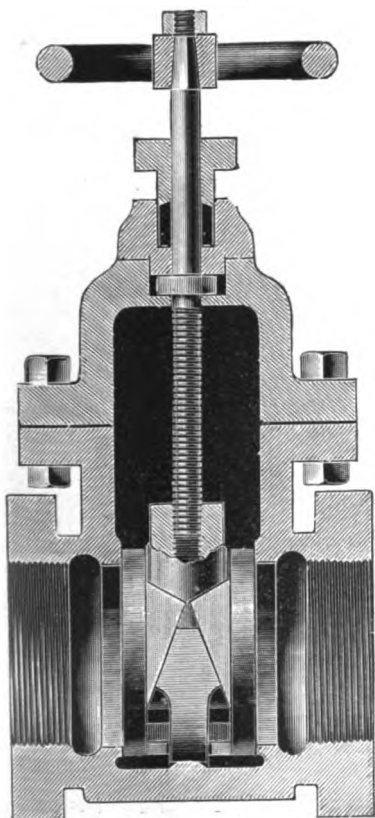
REGULAR.
FIGURE 675.HOSE.
FIGURE 675 A.

Polished or Plain.

QUICK OPENING.
FIGURE 676.

SECTION OF GATE VALVE.

FIGURE 677.



SHOWING INSIDE ARRANGEMENT AND PARTS.

Extension
of Stem,
to work discs

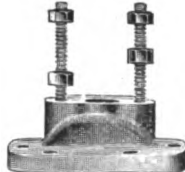
Stem.



Gland.

Stuffing
Box.

Body.



Bonnet.



Disk.



Wedge.



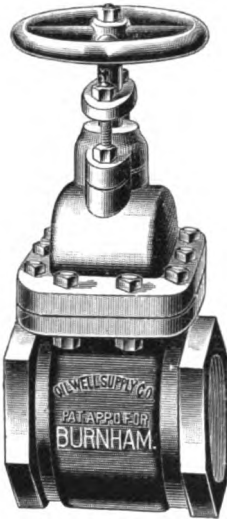
Wheel.

BURNHAM GATE VALVES.

ALL IRON, OR IRON BODY BRASS MOUNTED.

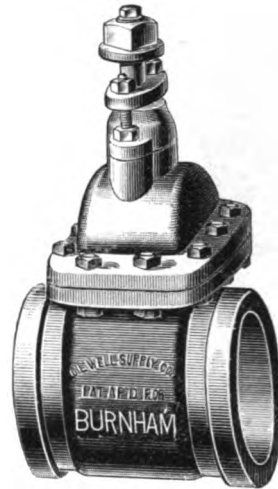
SCREWED.

FIGURE 68o.



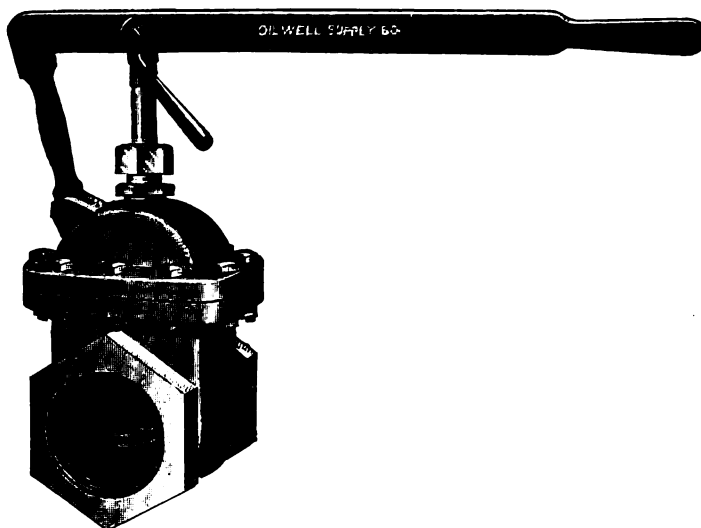
HUB ENDS FOR WATER.

FIGURE 68o A.



QUICK OPENING.

FIGURE 681.



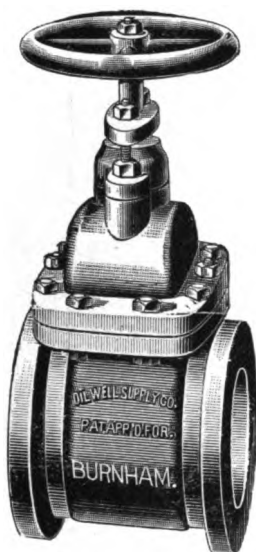
The Burnham Gate Valves are made in Standard Weights only.

BURNHAM GATE VALVES.

ALL IRON, OR IRON BODY BRASS MOUNTED.

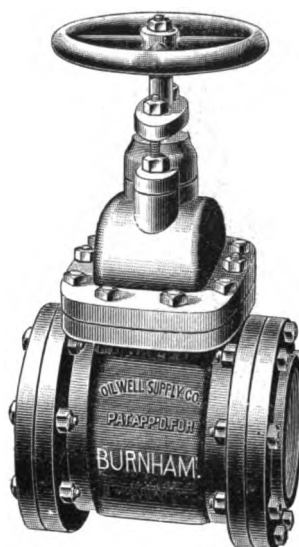
FLANGED.

FIGURE 682.



FLANGED WITH
EXTRA FLANGES BOLTED ON.

FIGURE 682 A.

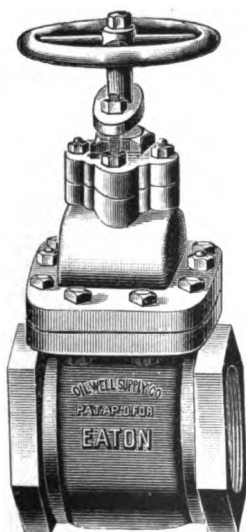


EATON GATE VALVES.

ALL IRON, OR IRON BODY BRASS MOUNTED.

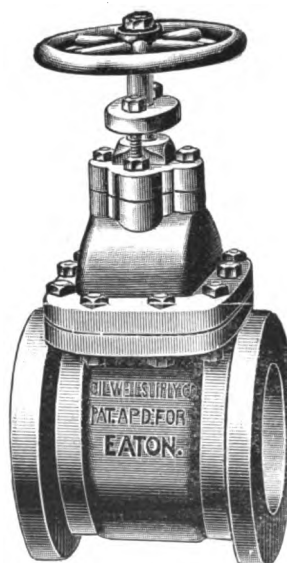
SCREWED.

FIGURE 682 B.



FLANGED.

FIGURE 682 C.

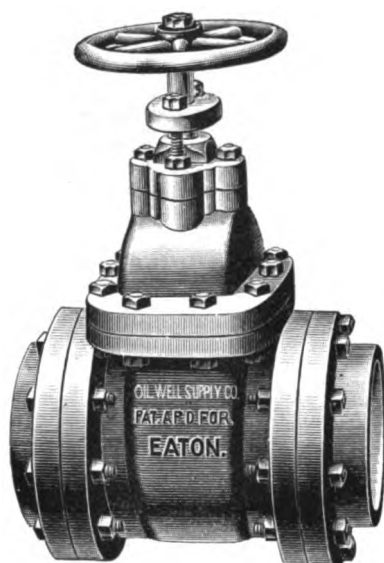


The Eaton Gate Valves are made Extra Heavy and are tested by an air pressure of 125 lbs., and a Hydraulic pressure of 500 lbs. to the square inch.

GATE VALVES.

EATON GATE VALVE,
FLANGED WITH EXTRA FLANGES
BOLTED ON.

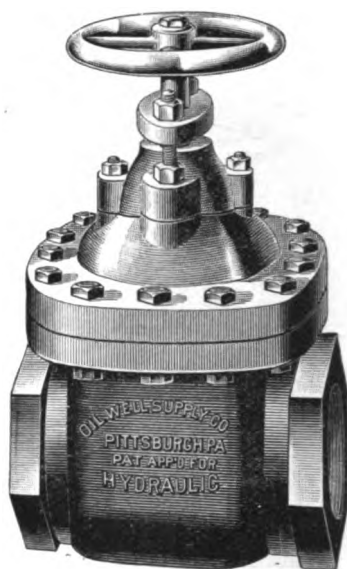
FIGURE 682 D.



All Iron, or Iron Body Brass Mounted.

HYDRAULIC GATE VALVE,
SCREWED.

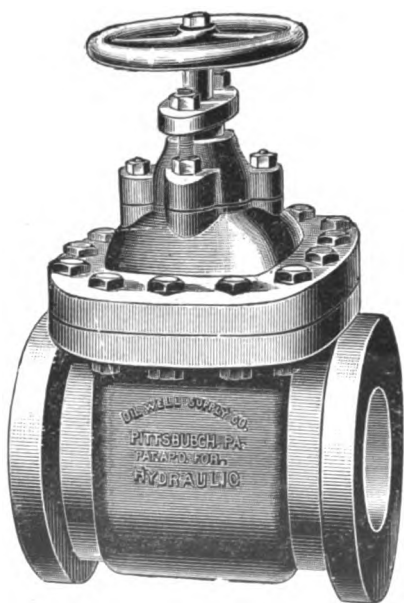
FIGURE 683.



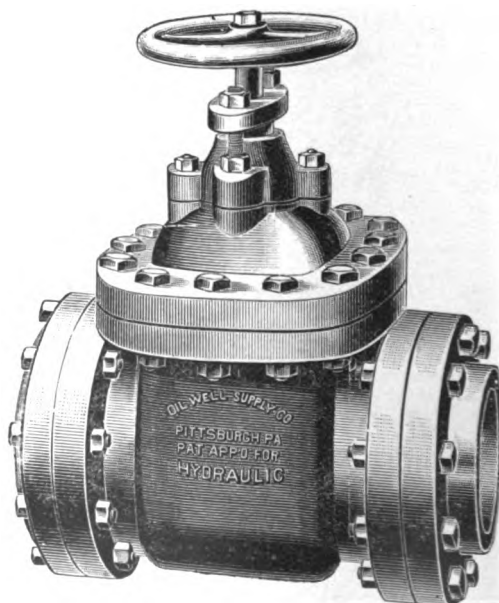
HYDRAULIC GATE VALVES,

ALL IRON, OR IRON BODY BRASS MOUNTED.

FLANGED.
FIGURE 684.



FLANGED
WITH EXTRA FLANGES BOLTED ON.
FIGURE 684 A.

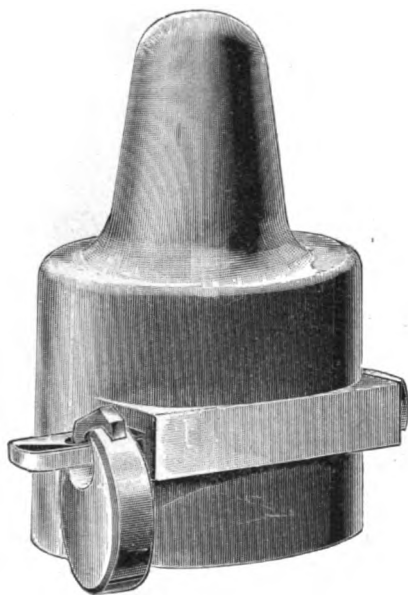


Hydraulic Gate Valves are tested by an air pressure of 125 lbs., and a Hydraulic pressure of 1,000 lbs to the square inch.

LOCK CAPS FOR GATE VALVES.

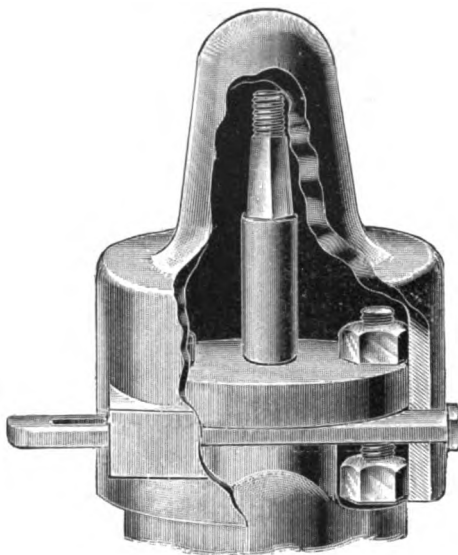
TO GO OVER STUFFING BOXES HELD BY TWO BOLTS.

FIGURE 685 A.



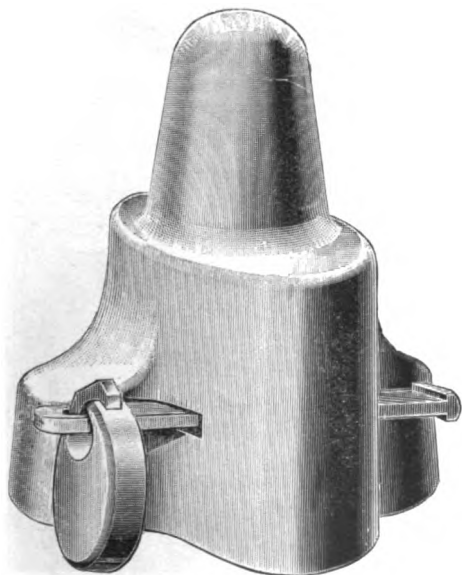
SECTION.

FIGURE 685 B.



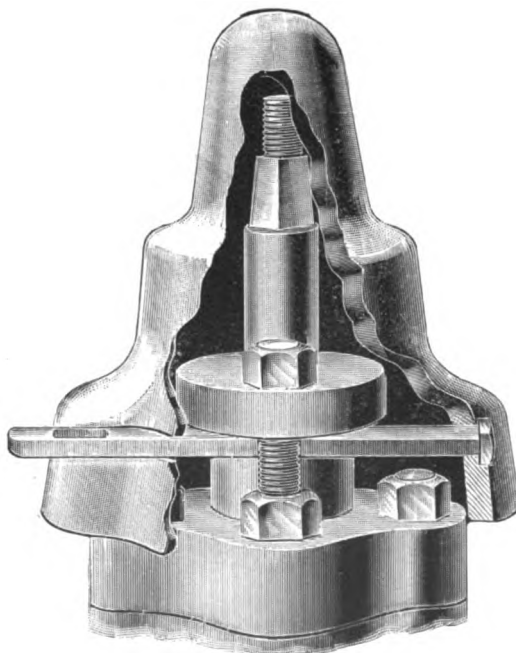
TO GO OVER STUFFING BOXES HELD BY FOUR BOLTS.

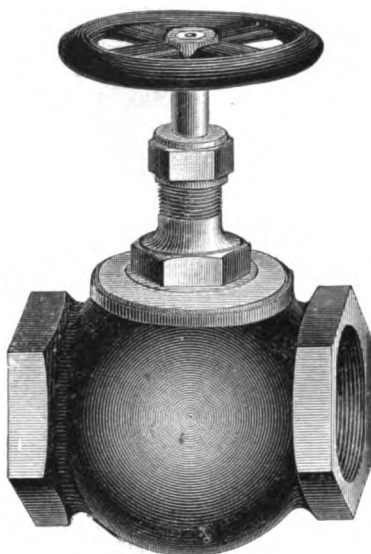
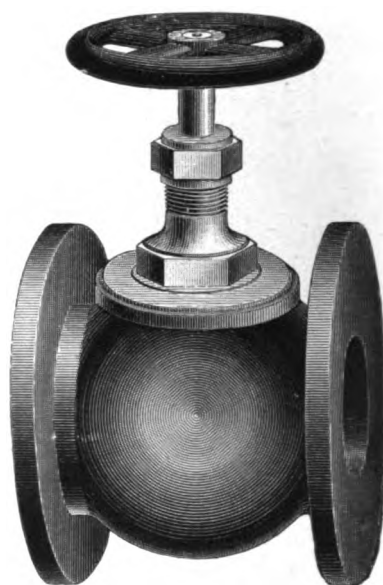
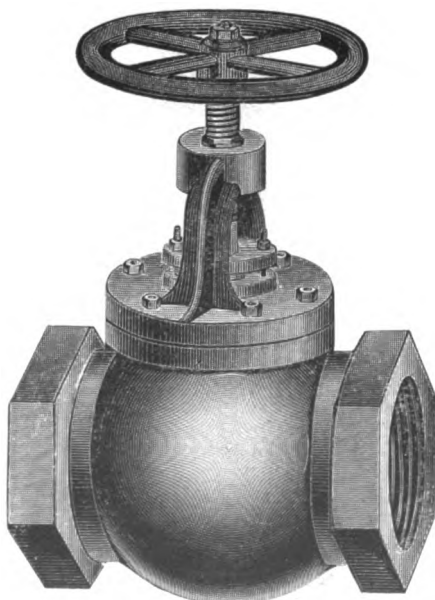
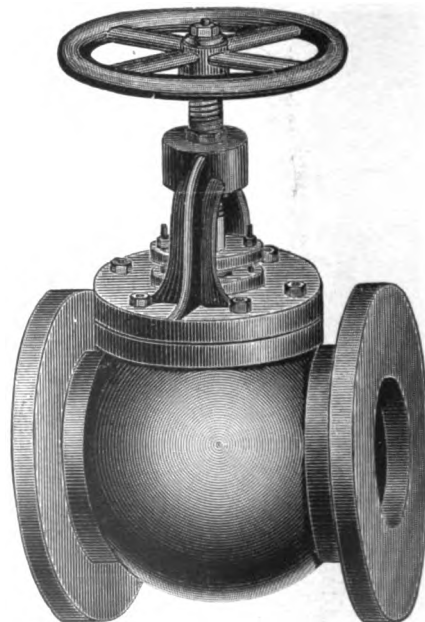
FIGURE 685 C.



SECTION.

FIGURE 685 D.



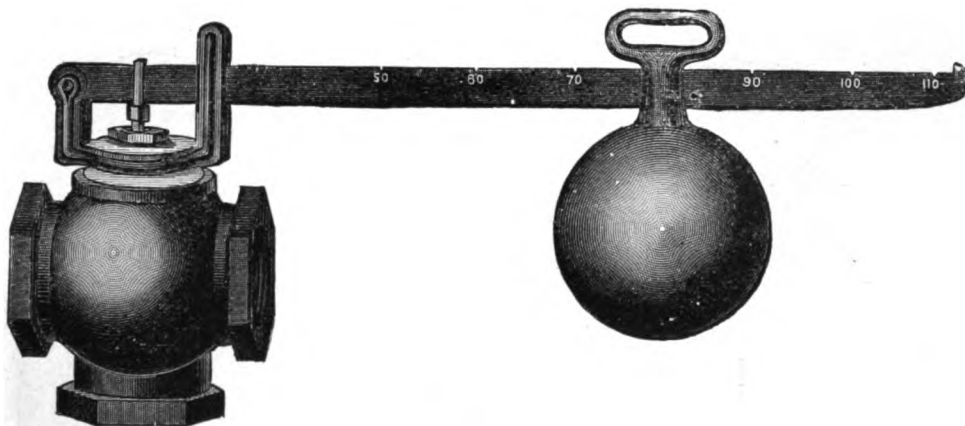
IRON BODY GLOBE VALVES.**BRASS MOUNTED.****SCREWED.****FIGURE 690.****FLANGED.****FIGURE 691.****WITH YOKE.****SCREWED.****FIGURE 690 A.****FLANGED.****FIGURE 691 A.**

IRON BODY SAFETY VALVES.

BRASS MOUNTED.

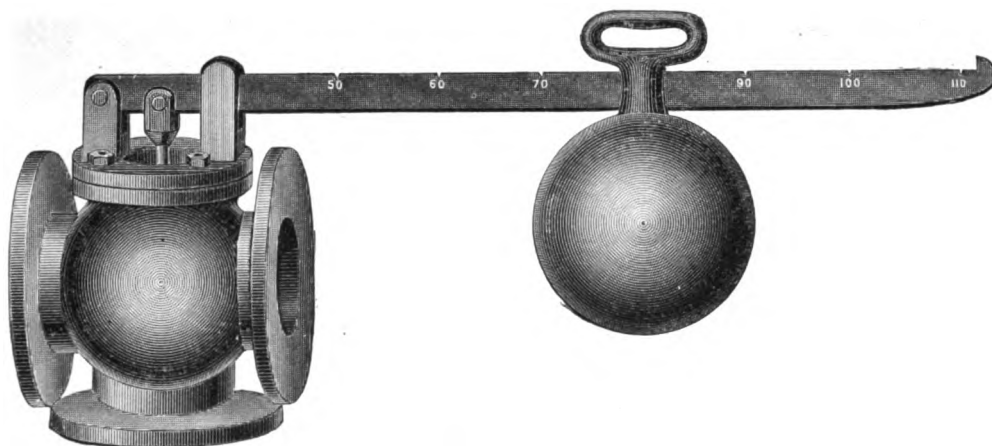
SCREWED.

FIGURE 692.



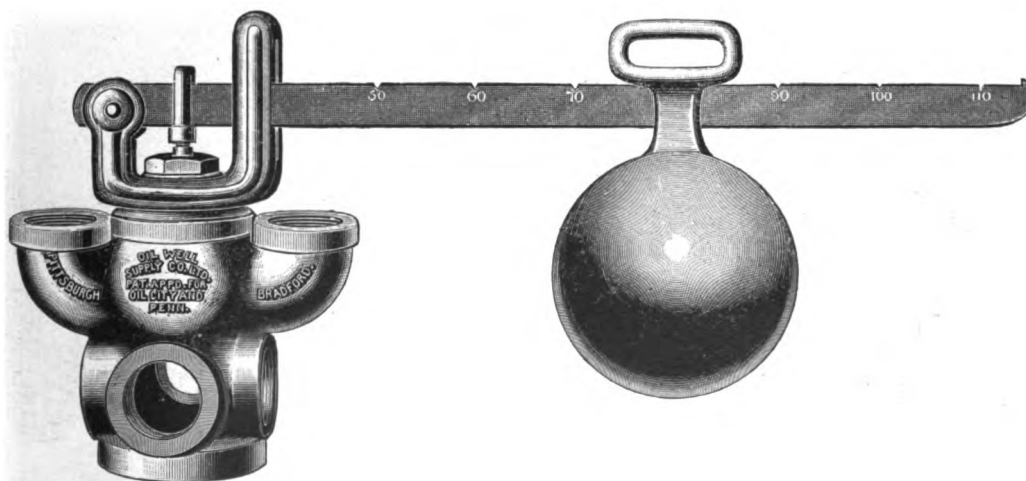
FLANGED.

FIGURE 693.



EATON SAFETY VALVE.

FIGURE 694.

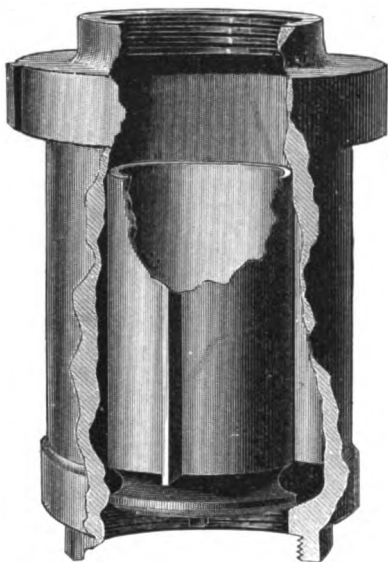


3 inch Inlet, Four 2 inch side Outlets, and Two 2 inch Outlets at top for blow off.

IRON VALVES AND COCKS.

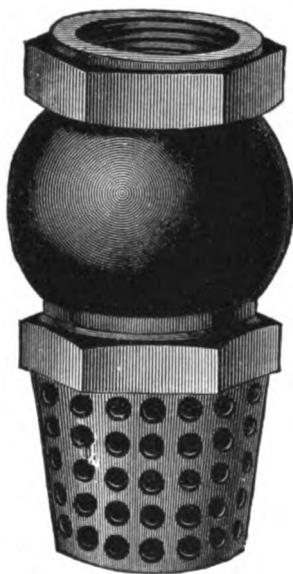
DEAD WEIGHT
SAFETY VALVE.

FIGURE 695.



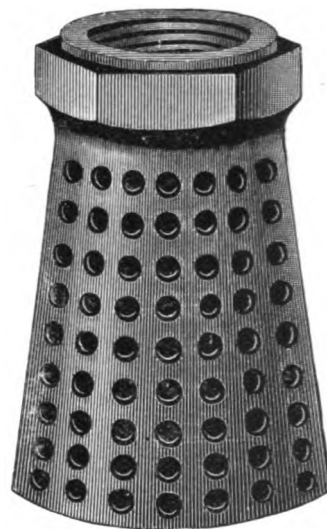
FOOT VALVE
WITH STRAINER.

FIGURE 696.



STRAINER.

FIGURE 697.

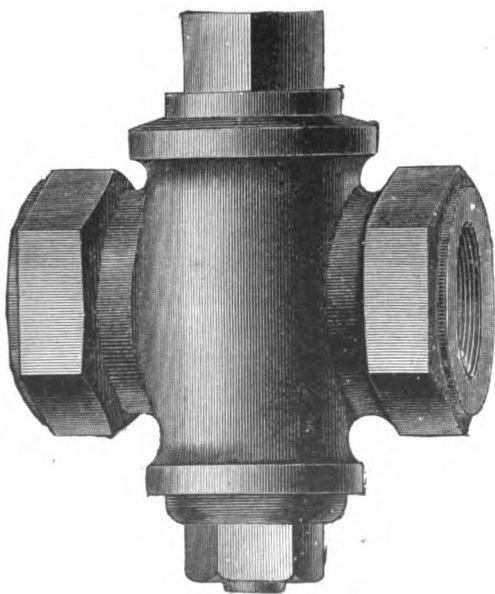


IRON COCKS.

No. 1.—HEAVY PATTERN.

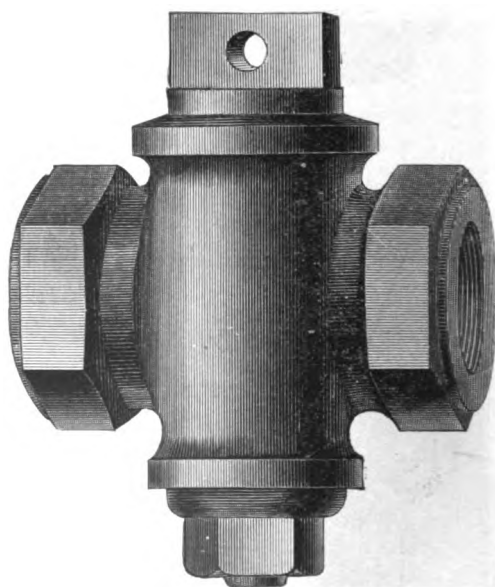
SQUARE HEAD.

FIGURE 700.



FLAT HEAD.

FIGURE 700 A.



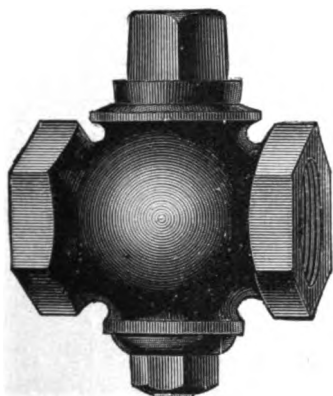
With Iron Plug and Iron Washer.
 " " " " Brass "
 " Brass " " " "

IRON COCKS.

No. 2.—REGULAR PATTERN.

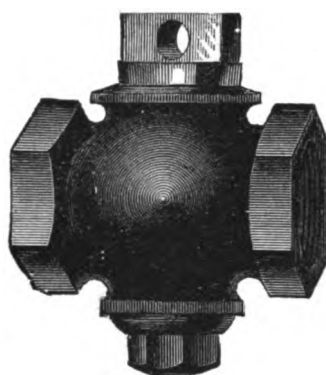
SQUARE HEAD.

FIGURE 701.



FLAT HEAD.

FIGURE 701 A.



With Iron Plug and Iron Washer.

" " " " Brass "

" Brass " " " " "

ROUND WAY.

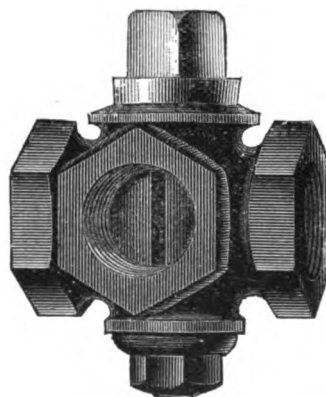
FIGURE 702.



With Iron Plug and Brass Washer.

THREE WAY.

FIGURE 703.

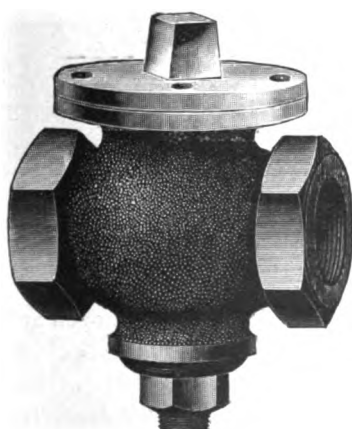


With Iron Plug and Iron Washer.

LOCK COCKS.

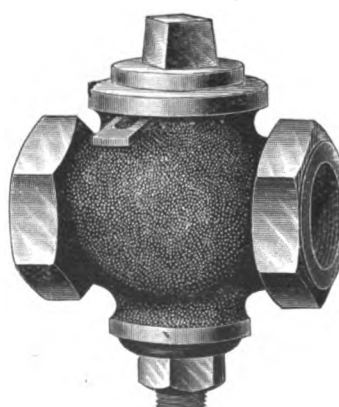
FLANGED TOP.

FIGURE 704.



ESSEX PATENT.

FIGURE 705.

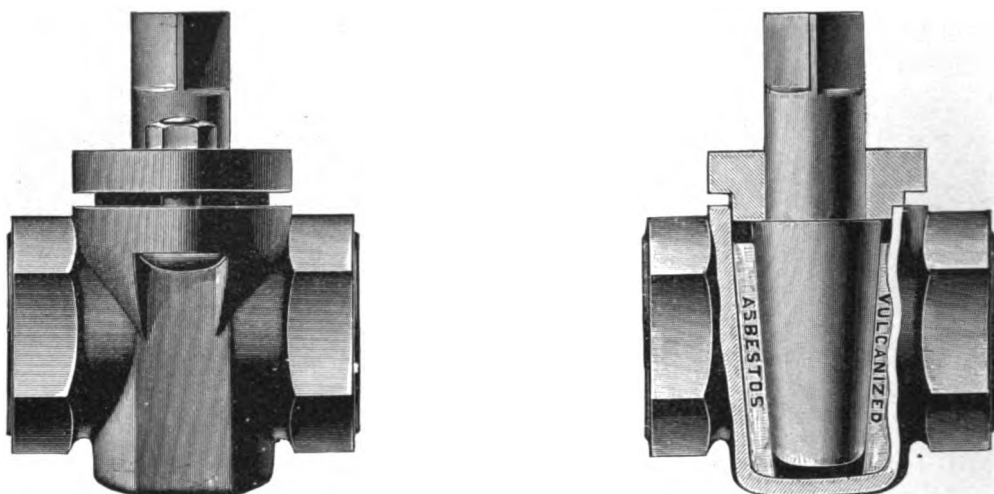


With Brass Washers. Locks Extra.

ASBESTOS PACKED BRASS AND IRON COCKS.

STRAIGHT-WAY COCK.

FIGURE 708.



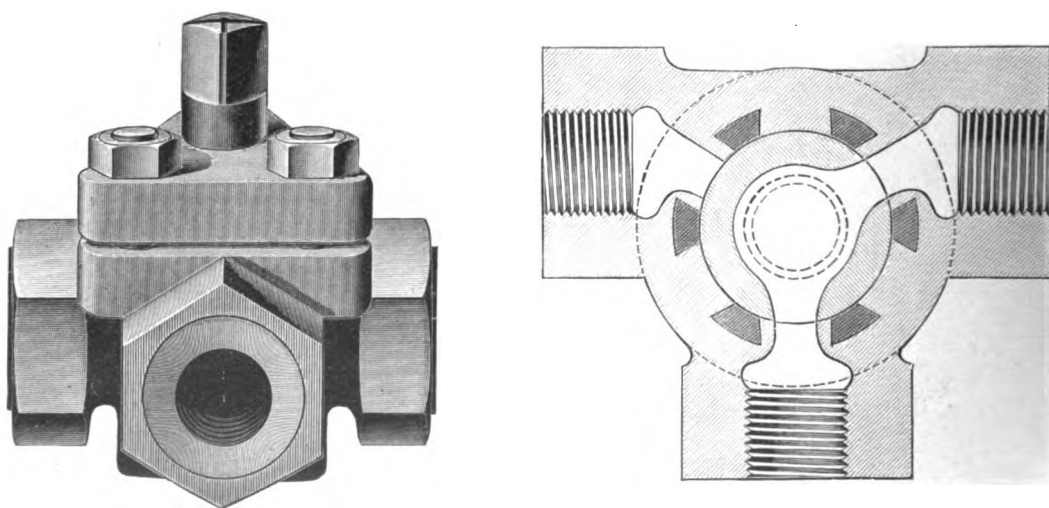
Screwed or Flanged.

The plug comes in contact *only with Vulcanized Asbestos* which is hydraulically packed in four slots in the body of the cock, thereby preventing its bearing against the metal, and thus overcoming the objectionable features of cocks having the plug with a bearing on metal. The plugs are barfed and rendered rustless. The regular cocks are guaranteed to stand a pressure of 300 pounds, and they not only remain tight but turn easily. They can be used on Steam, Water, Gas, Oil, Air, Ammonia, Caustic Soda, and in any place where other Cocks are not satisfactory.

THREE WAY COCK.

"A" PATTERN.

FIGURE 708 A.

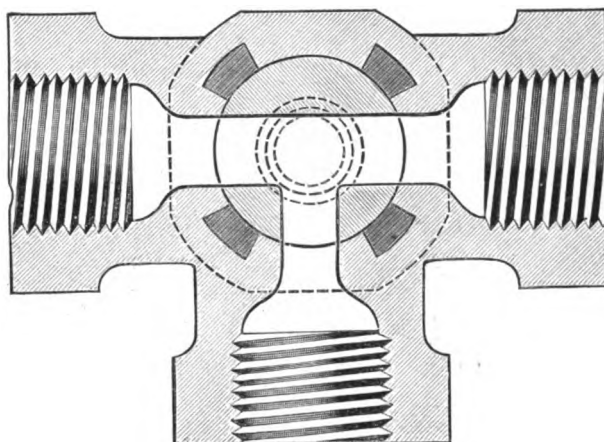
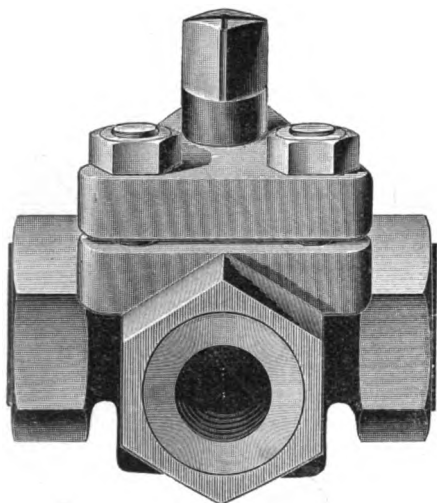


Screwed or Flanged.

This Cock has two openings in the Plug, with six packings in the Barrel, and will open and close as follows :

Port 1 to Port 2, closing Port 3, or Port 1 to Port 3, closing Port 2, or Port 2 to Port 3, closing Port 1.

It will close all three Ports, and will open or close any two Ports before opening or closing the other. All three Ports can never be opened at once.

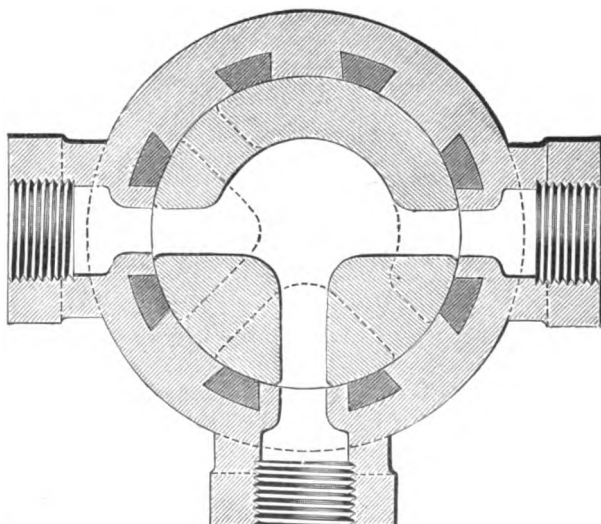
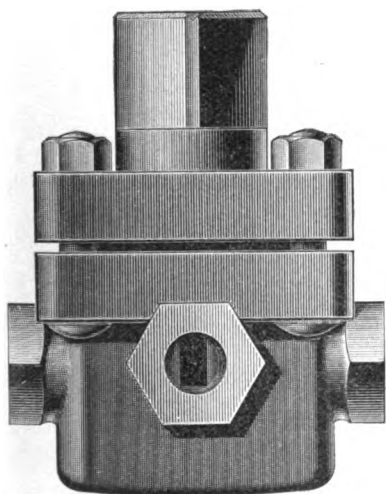
ASBESTOS PACKED BRASS AND IRON COCKS.**THREE WAY COCK.****"B" PATTERN.****FIGURE 708 B.**

Screwed or Flanged.

This cock has three openings in the Plug, with four packings in the Barrel, and will open and close as follows :

Port 1 to Ports 2 and 3 opening all ; or, Port 1 to Port 3, closing Port 2 ; or, Port 1 to Port 2, closing Port 3.

It will close but one Port at a time, two Ports always remaining open.

THREE WAY COCK.**"C" PATTERN.****FIGURE 708 C.**

Screwed or Flanged.

This Cock has three openings in the Plug, with eight packings in the Barrel, and will open and close as follows :

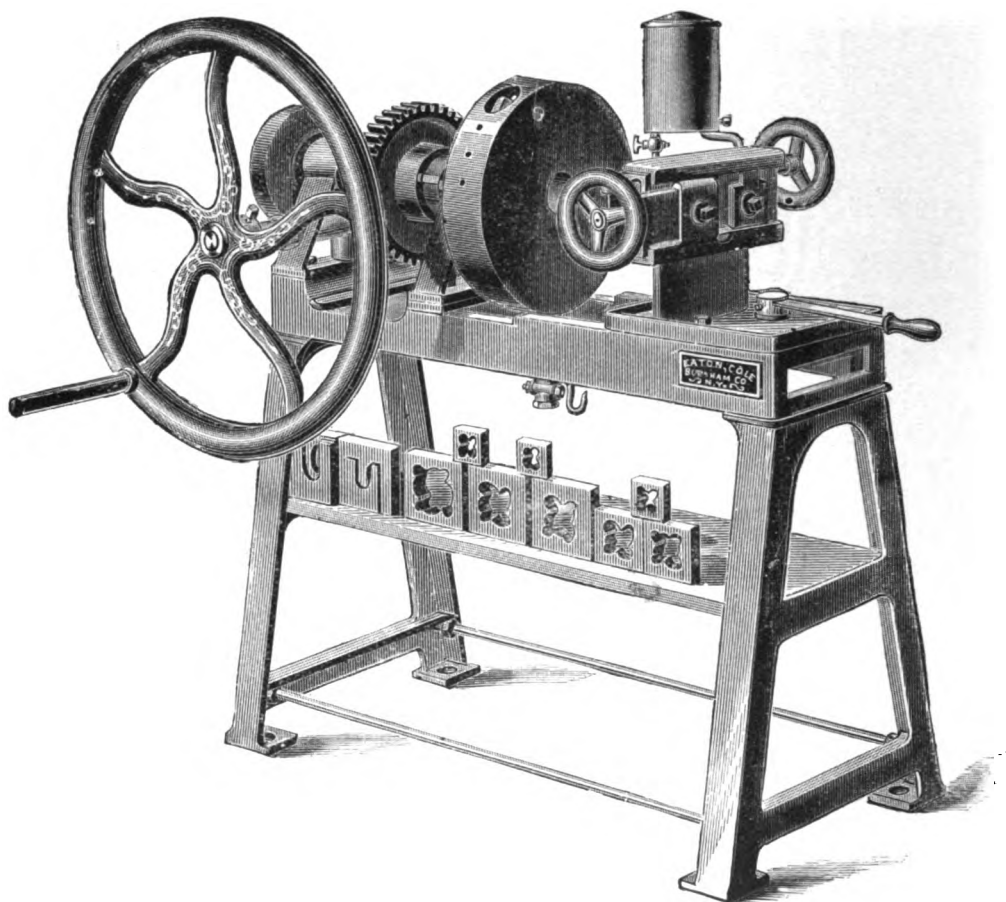
Port 1 to Ports 2 and 3, opening all, or port 1 to Port 2, closing Port 3, or Port 1 to Port 3, closing Port 2.

It will open or close any two Ports before opening or closing the other, and will open or close all three Ports at once.

PIPE CUTTING AND THREADING MACHINE.

No. 1, FOR HAND.

FIGURE 710.



HAND MACHINE.—With right-hand solid dies, $\frac{1}{8}$ inch to 2 inches inclusive, and set of nipple holders complete.

DISTINCTIVE FEATURES.

Concentric Chuck for holding pipe, which for simplicity, durability and holding quality is far superior to any other in the market, always centering the pipe, and in combination with universal chuck at back of spindle (doing away with guides), bringing the pipe in perfect line with the die, thereby preventing the possibility of cutting crooked threads.

There are *three* changes of speed.

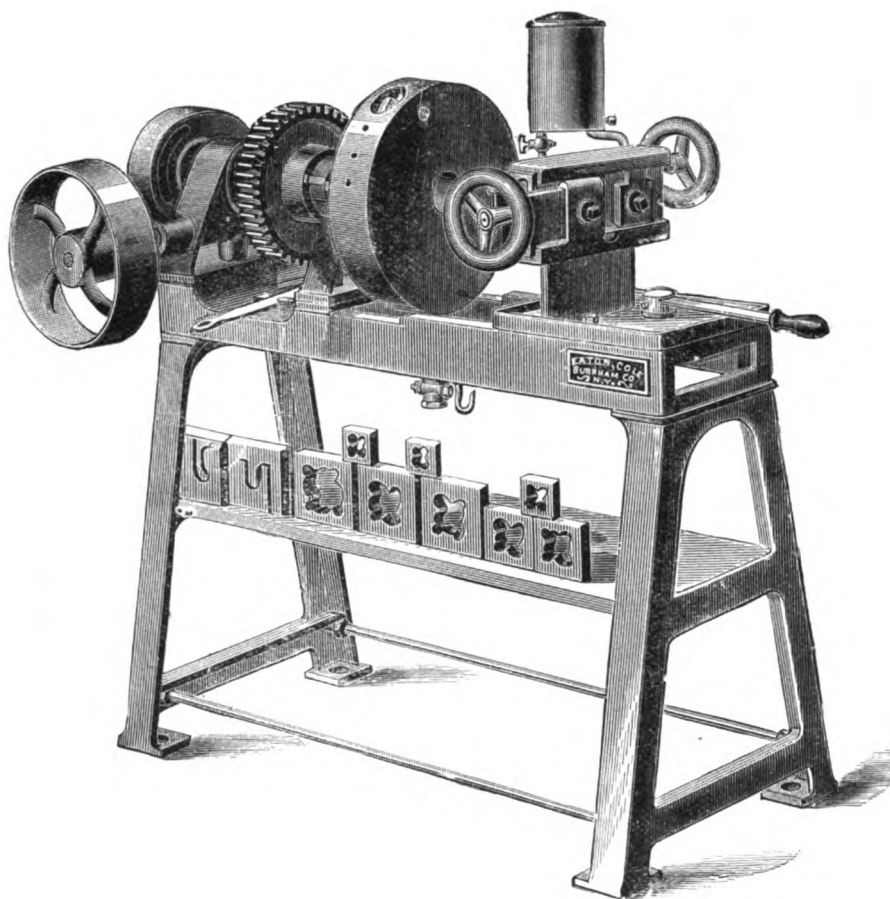
Die Head is arranged with self-centering jaws, and cut-off tool slide, for cutting off pipe. An extra heavy hand-wheel is furnished with this machine. Weight of machine, 460 pounds.

Manufacturing these machines in quantities, we can furnish them at a low price, and but little in excess of the cost of a set of Stocks and Dies, cutting-off tools and vise, all of which it will supersede.

PIPE CUTTING AND THREADING MACHINE.

No. 1, FOR POWER.

FIGURE 710 AA.



CAN ALSO BE USED BY HAND.

POWER MACHINE.—With right-hand solid dies, $\frac{1}{8}$ to 2 inches, inclusive, hand-wheel, pulleys, countershaft and set of nipple holders, complete.

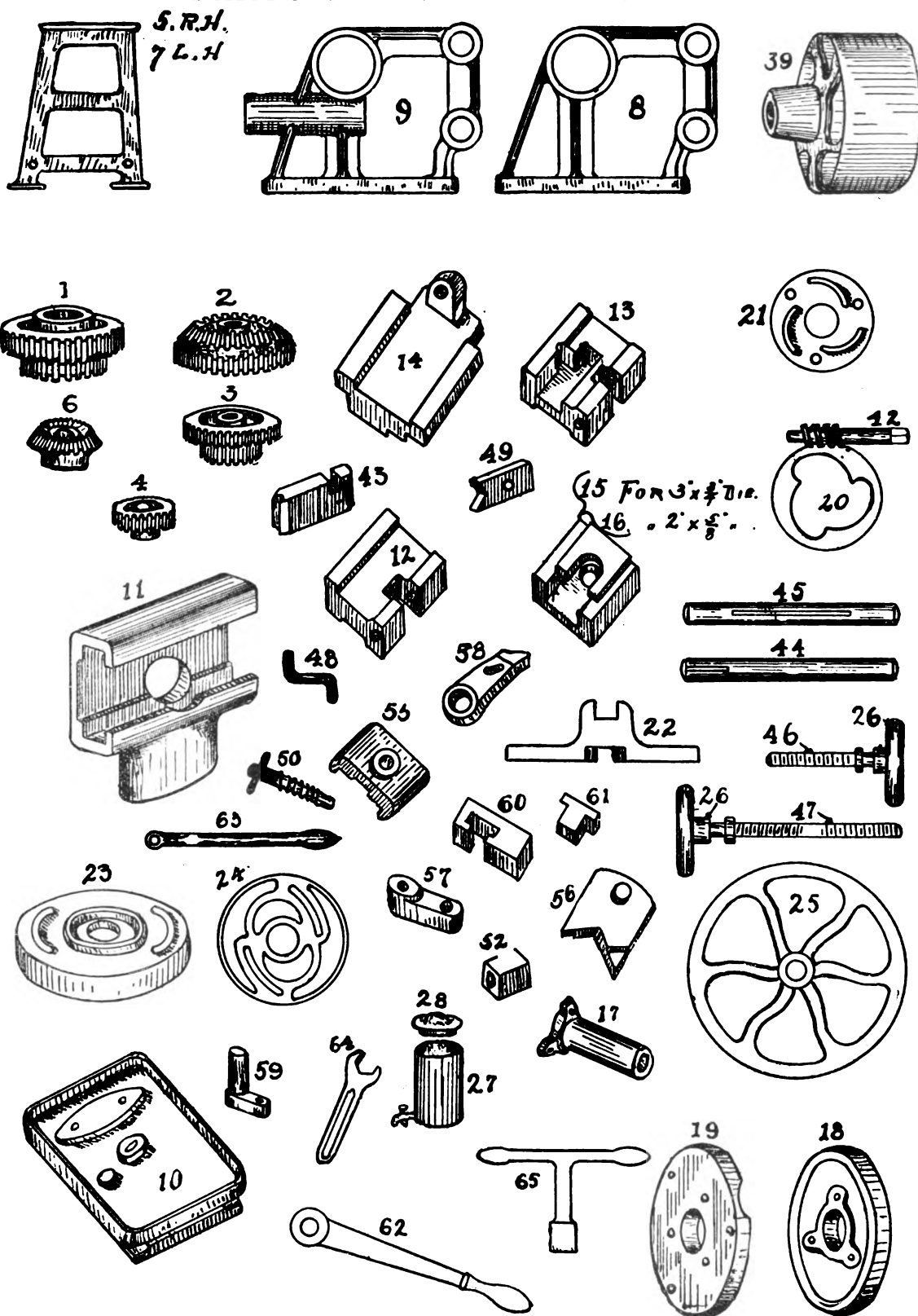
DISTINCTIVE FEATURES.

Concentric Chuck for holding pipe, which, for simplicity, durability and holding quality is far superior to any other in the market, always centering the pipe, and in combination with universal chuck at back of spindle (doing away with guides) bringing the pipe in perfect line with the die, thereby preventing the possibility of cutting crooked threads.

There are *three* changes of speed.

Die Head is arranged with self-centering jaws, and cutting-off tool slide, for cutting off pipe. An extra heavy hand wheel is furnished with this machine, also countershaft and pulleys. Countershaft should run 160 revolutions per minute. Weight of machine, 660 lbs.

PARTS OF No. 1 PIPE MACHINE.



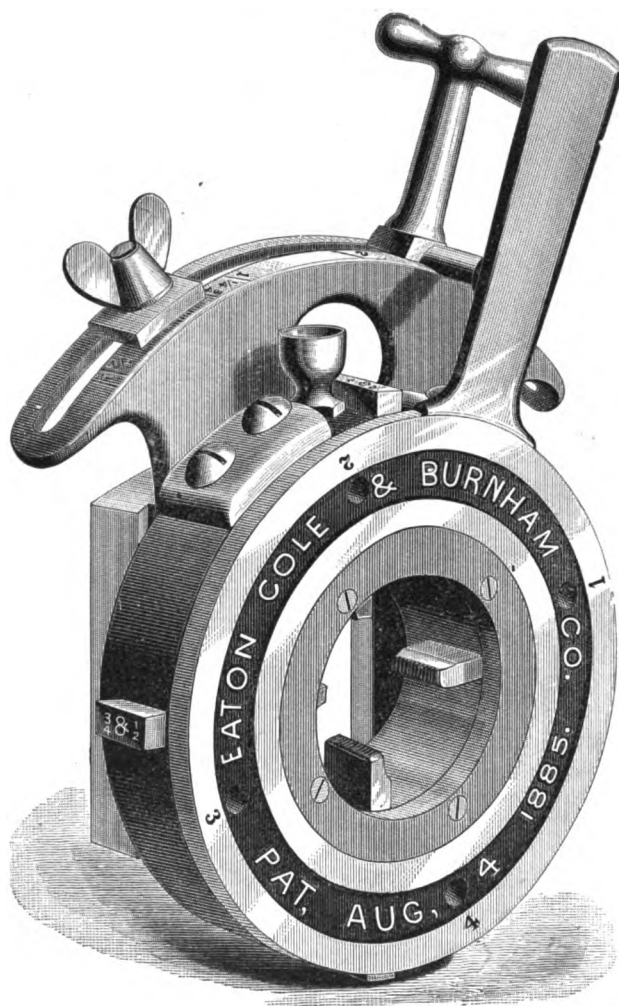
ORDER THE ABOVE BY NUMBERS. THE FOLLOWING ARE NOT ILLUSTRATED.

- | | | |
|---------------------|---------------------------|------------------------|
| No. 29 Hangers. | No. 37 Pulley, 6" Face. | No. 71 Countershaft. |
| " 30 Boxes. | " 38 Pulley, 3" Face. | " 72 Cutting-Off Tool. |
| " 31 Belt Fingers, | " 40 Collars for Machine. | " 73 Shipper Rod. |
| " 32 Oil Drip Cups, | " 41 " C. Shaft. | " 74 " " Stop. |
| " 35 Box Seats. | " 51 Reamer Block. | " 75 Leg Rods. |
| " 36 Box Plugs. | " 70 Bed. | |

ADJUSTABLE DIE HEAD.

FOR No. 1 PIPE MACHINE.

FIGURE 710 A.



Threads..... $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 inch Pipe.

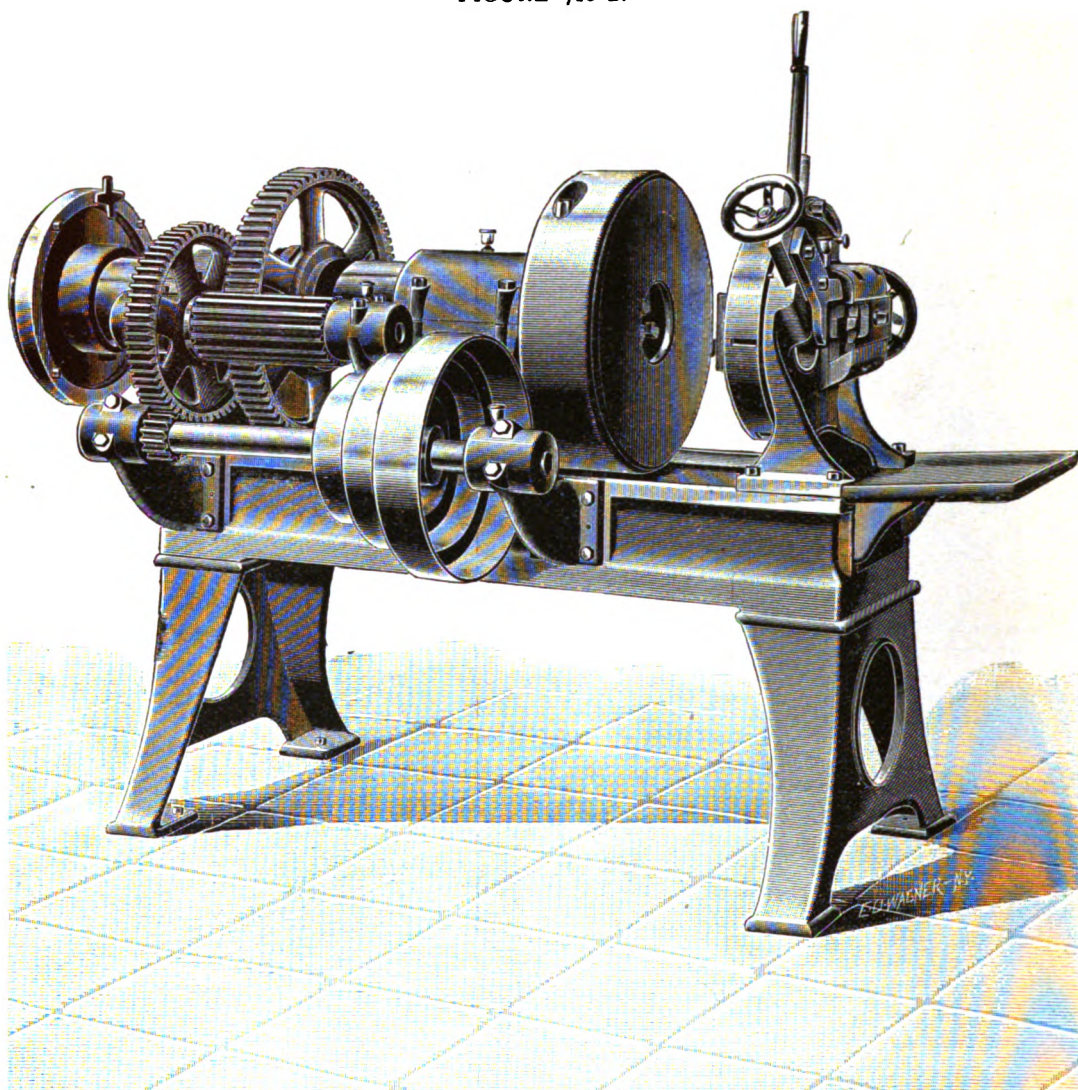
EXPANDING DIES.

Adapted for any two-inch pipe machine having die frame four inches square and taking die from top.

PIPE CUTTING AND THREADING MACHINE.

No. 2, ARRANGED FOR BELT POWER.

FIGURE 710 B.



This machine has Cone Pulleys for regulating the different speeds to suit size of pipe to be cut. No gearing to be changed. All gears are *cut*, thereby making perfect-fitting teeth.

The Concentric Chuck for holding pipe has three steel jaws that are actuated by an eccentric ring driven by worm and gear, making the most powerful chuck in use.

The Die Head is bolted to the bed of the machine, thereby insuring the proper position of the dies while the required lead for the thread is obtained by a lateral movement of spindle and chuck.

When the threads are cut, the dies are opened by throwing over the lever, thus relieving the pipe as soon as threaded, also allowing the cut-off tool to be used without removing the dies.

A Cage is attached to die head so that Solid dies or Adjustable die head Figure 710 A, can be used if desired.

This machine has Countershaft and Pulleys Complete.

Speed of countershaft, No. 2 machine, 350 revolutions per minute.

Weight of No. 2 Machine (on skids for shipment,) 2,275 lbs.

No. 2 Machine threads 1 to 4 inch pipe, and from 2 to 4¼ inch casing.

DIES FURNISHED WITH NO. 2 MACHINE.

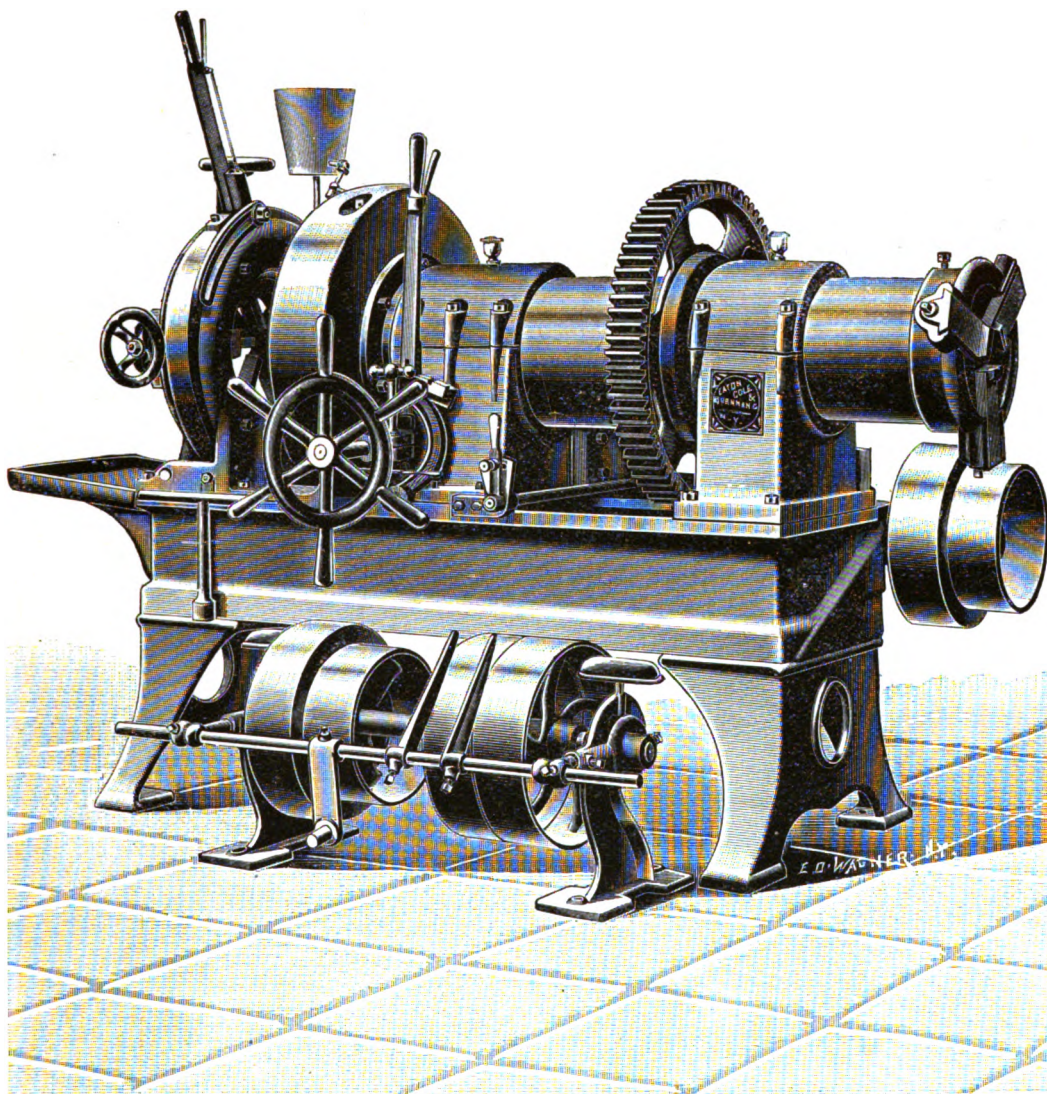
One Set Cutting 1	inch Pipe,				
One " " 1¼	" "				
One " " 1½ and 2	" "				
One " " 2½	" 3				
One " " 3	" 4				
		} 11½ threads			
		} 8 threads.			
		Furnished Extra, { One " " 2½, 3 and 3½ Line Pipe, 11½ threads.			
		{ One " " 4, " " 10 " "			
One Set Cutting 2¼, 3 and 3¼	inch Casing,				
One " " 3½, 3¾, 4 and 4¼	" "				
		} 14 threads.			

PIPE CUTTING AND THREADING MACHINE.

ARRANGED FOR BELT POWER.

WORKING SIDE No. 3 AND No. 4.

FIGURE 711.



This machine has Cone Pulleys for regulating the different speeds to suit size of pipe to be cut. No gearing to be changed. All gears are *cut*, thereby making perfect-fitting teeth.

The Concentric Chuck for holding pipe has three steel jaws actuated by an eccentric ring driven by worm and gear, making the most powerful chuck in use.

The Die Head is bolted to the bed of the machine, thereby insuring the proper position of the dies, while the required lead for the thread is obtained by a lateral movement of spindle and chuck. The lead-screw connection can be attached or detached while the machine is in motion.

In cutting threads, the dies are opened by throwing over the lever, thus relieving the pipe as soon as threaded, and allowing the cut-off tool to be used without removing the dies.

This machine has Countershaft and Pulleys complete.

We also manufacture the same machine with Steam Engine attached, connected direct to main driving-shaft, thus avoiding the use of countershaft and pulleys.

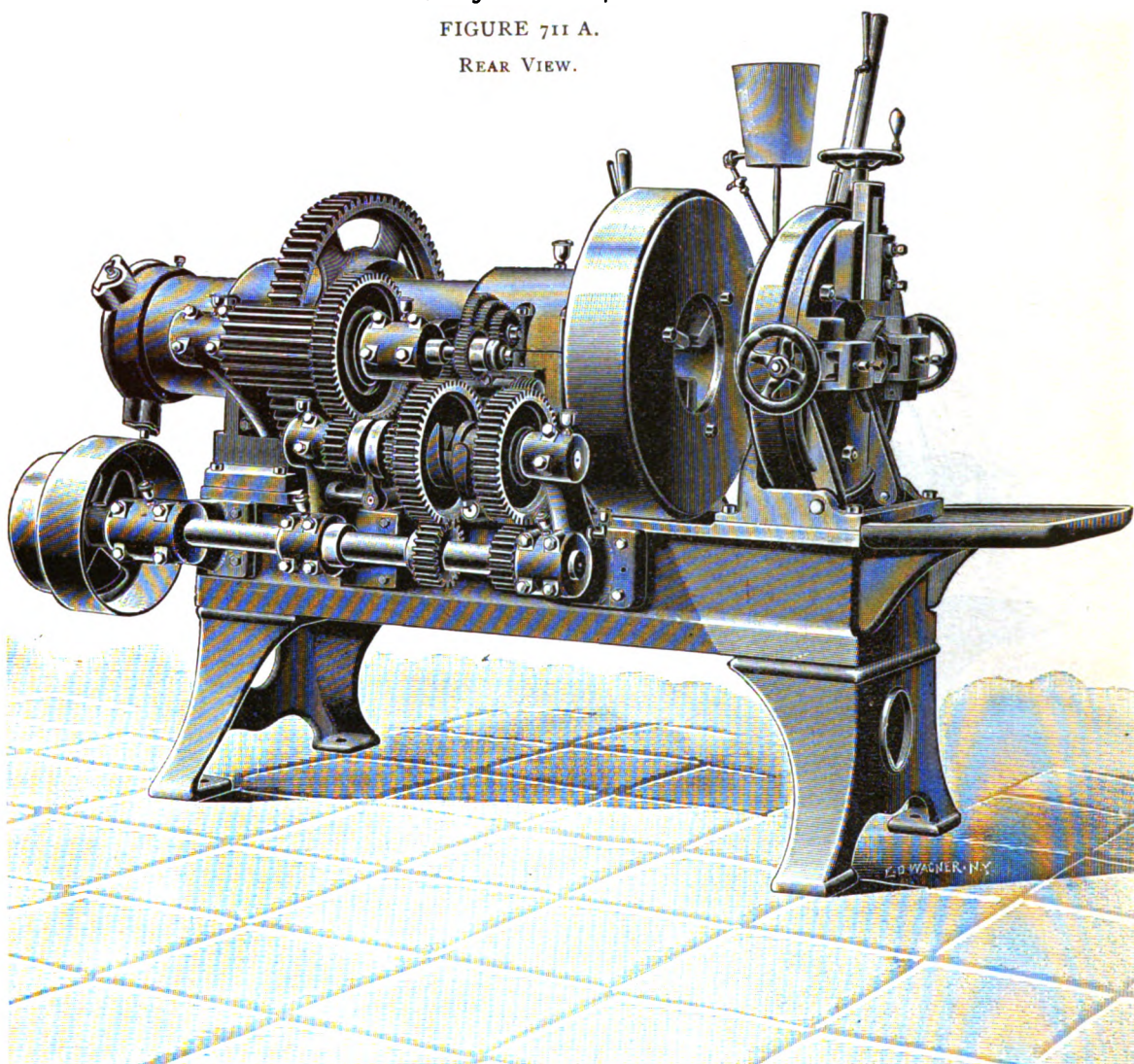
PIPE CUTTING AND THREADING MACHINE.

ARRANGED FOR BELT POWER.

No. 3 AND No. 4.

FIGURE 711 A.

REAR VIEW.



The main shaft runs all the time. The machine is started and stopped by a lever operating a clutch.

Speed of countershaft for No. 3 Machine, 250 revolutions per minute.

Speed of countershaft for No. 4 " " " " 225

Weight of No. 3 Machine (on skids for shipment), 3,600 lbs.

Weight of No. 4 Machine " " " " " " 3,950 "

No. 3 Machine threads 1 to 6 inch pipe and 3 to 6 1/4 inch casing.

No. 4 Machine threads 2 1/2 to 8 inch pipe and 3 to 8 1/4 inch casing.

DIES FURNISHED WITH NO. 3 MACHINE.

One Set Cutting 1 and 1 1/4 inch Pipe, }	11 1/2 threads.	One Set Cutting 4 1/2 and 5 inch Pipe, }	8 threads.
One " " 1 1/2 " 2 " " " }	11 1/2 threads.	One " " 6 " " " }	8 threads.
One " " 2 1/2 " 3 " " " }	8 threads.	One " " 3, 3 1/4, 3 1/2, 3 3/4, 4 and 4 1/4 inch Casing }	14 threads.
One " " 3 1/2 " 4 " " " }	8 threads.	One " " 4 1/2, 4 3/4, 5, 5 1/4, 5 1/2, 6 " " }	14 threads.

One Set Cutting 5, 5 1/8, 5 3/8 and 6 1/4 inch Casing, 11 1/2 threads to the inch.

DIES FURNISHED WITH NO. 4 MACHINES.

One " " 2 1/2 " 3 " " " }	8 threads.	One Set Cutting 3, 3 1/4, 3 1/2, 3 3/4, 4 and 4 1/4 inch Casing }	14 threads.
One " " 3 1/2 " 4 " " " }	8 threads.	Two " " 4 1/2, 4 3/4, 5, 5 1/4, 5 1/2, 6 " " }	14 threads.
One " " 4 1/2 " 5 " " " }	8 threads.	Two " " and 7 1/4 inch Casing.	14 threads.
One " " 6 " " " " }	8 threads.	Two Set Cutting 5, 5 1/8, 5 3/8, 6 1/4, 6 3/8, 7 1/8 and 8 1/4 inch Casing }	11 1/2 threads.
One " " 7 " " " " }	8 threads.		
One " " 8 " " " " }	8 threads.		

EXTRA DIES FURNISHED WITH NOS. 3 AND 4 INCH MACHINES.

One Set 2 1/2, 3 and 3 1/2 inch Line Pipe, 11 1/2 threads. | One Set 4 inch Line Pipe, 10 threads.

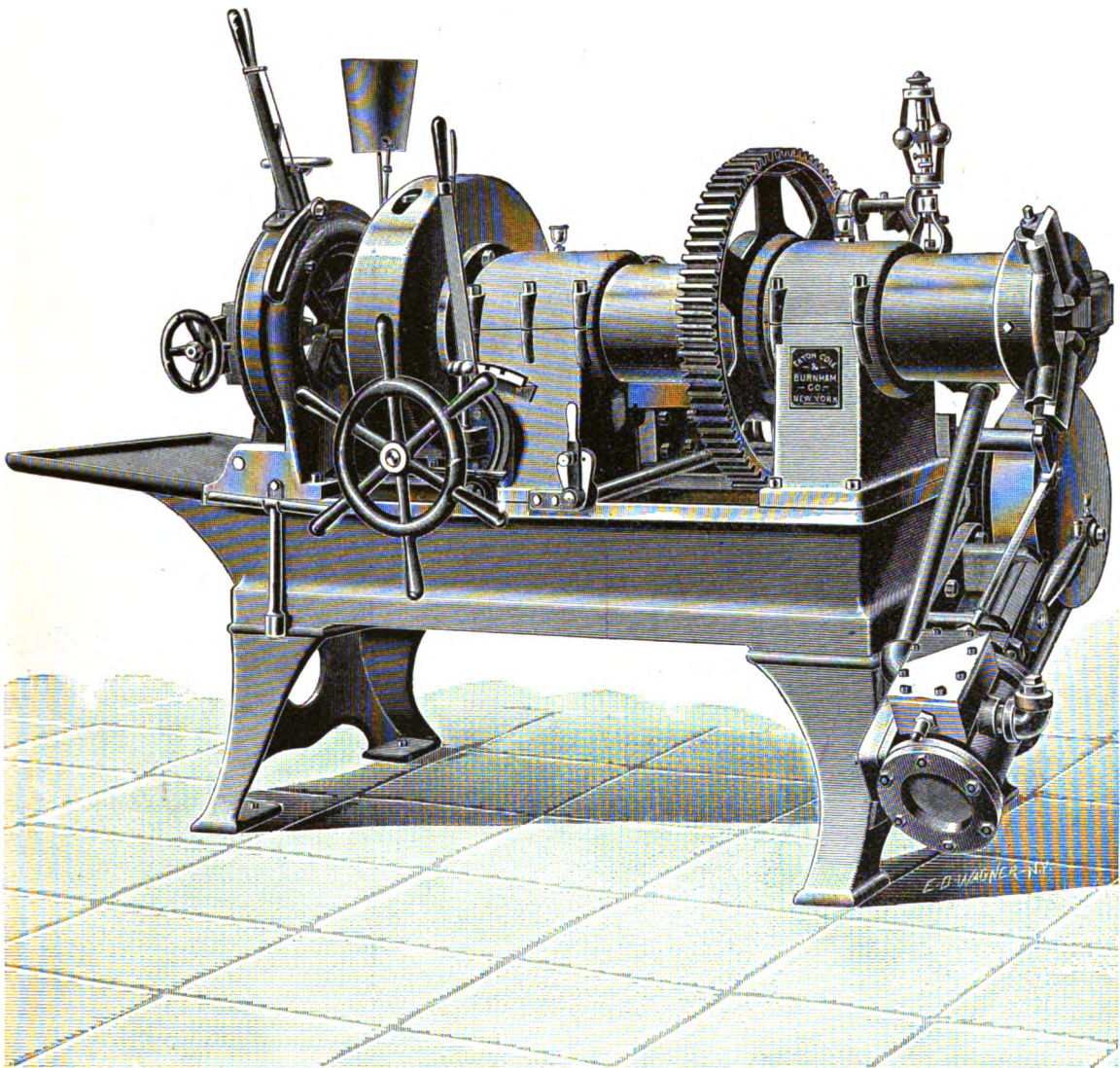
SEE PREVIOUS PAGE FOR DESCRIPTION.

PIPE CUTTING AND THREADING MACHINE.

WITH ENGINE ATTACHMENT.

WORKING SIDE, No. 3 AND No. 4.

FIGURE 712.



This style of machine is useful where shafting is not available, or when it may be desirable to run independently of other machinery, or to run overtime. No gearing to be changed, and all gears are *cut*, thereby making perfect-fitting teeth.

The Concentric Chuck for holding pipe has three steel jaws that are actuated by an eccentric ring driven by worm and gear, making the most powerful chuck in use.

The Die Head is bolted to the bed of the machine, thereby insuring the proper position of the dies while the required lead for the thread is obtained by a lateral movement of spindle and chuck. The lead-screw connection can be attached or detached while the machine is in motion.

In cutting threads, the dies are opened by throwing over the lever, thus relieving the pipe as soon as threaded, and allowing the cut-off tool to be used without removing the dies.

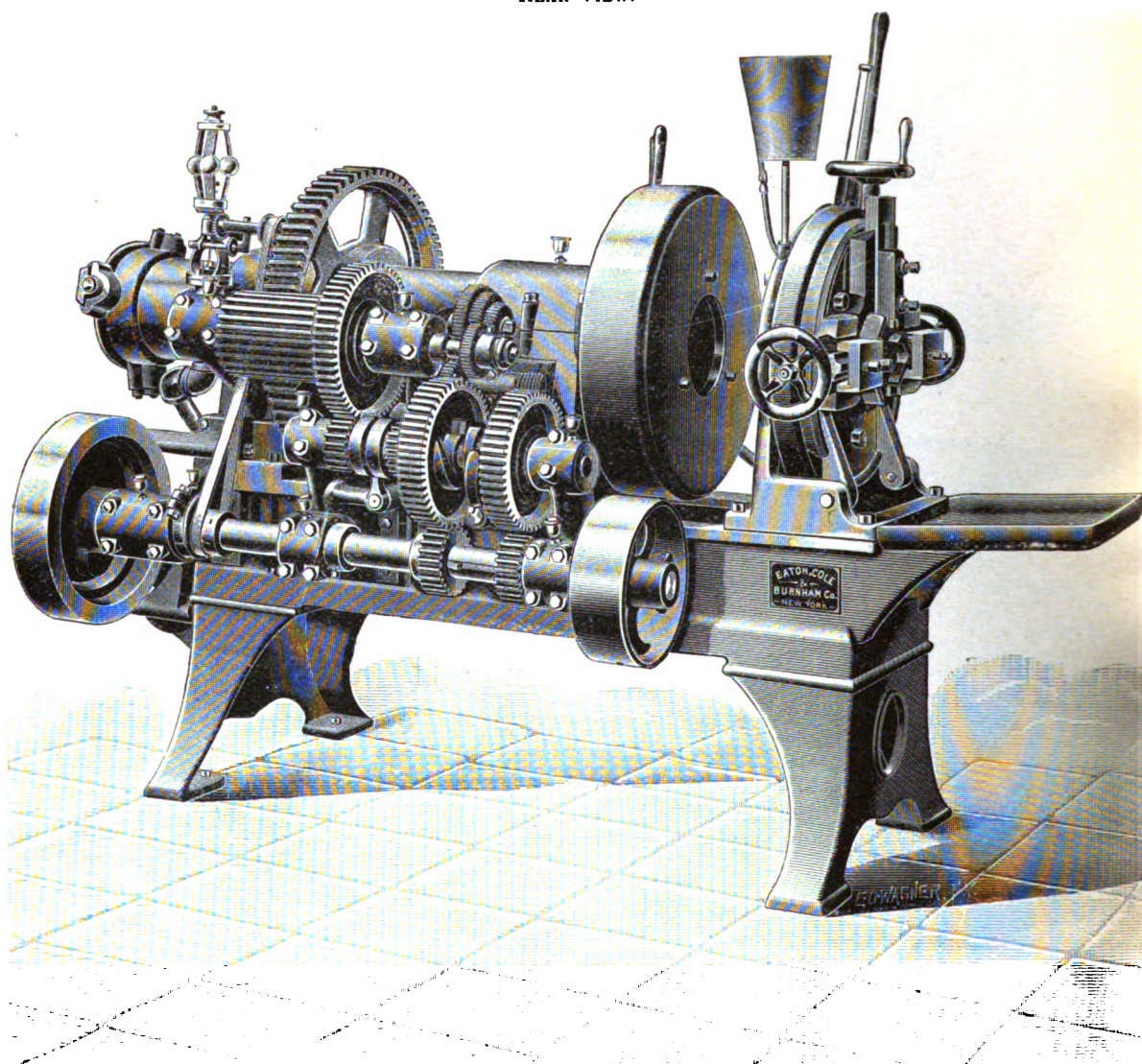
PIPE CUTTING AND THREADING MACHINE.

WITH ENGINE ATTACHMENT.

No. 3 AND No. 4.

FIGURE 712 A.

REAR VIEW.



The main shaft runs all the time. The machine is started and stopped by a lever operating a clutch.

The small pulley on the right of the main shaft can be connected by a belt to over-head shafting to operate a drill press, grindstone, small pipe machine, or other light machinery.

Weight of No. 3 Machine (on skids for shipment),	3,600 lbs.
Weight of No. 4 Machine " " " "	3,950 "

No. 3 Machine threads 1 to 6 inch pipe and casing.

No. 4 Machine threads 2½ to 8 inch pipe and casing.

See page 236 for list of Dies.

SEE PREVIOUS PAGE FOR DESCRIPTION.

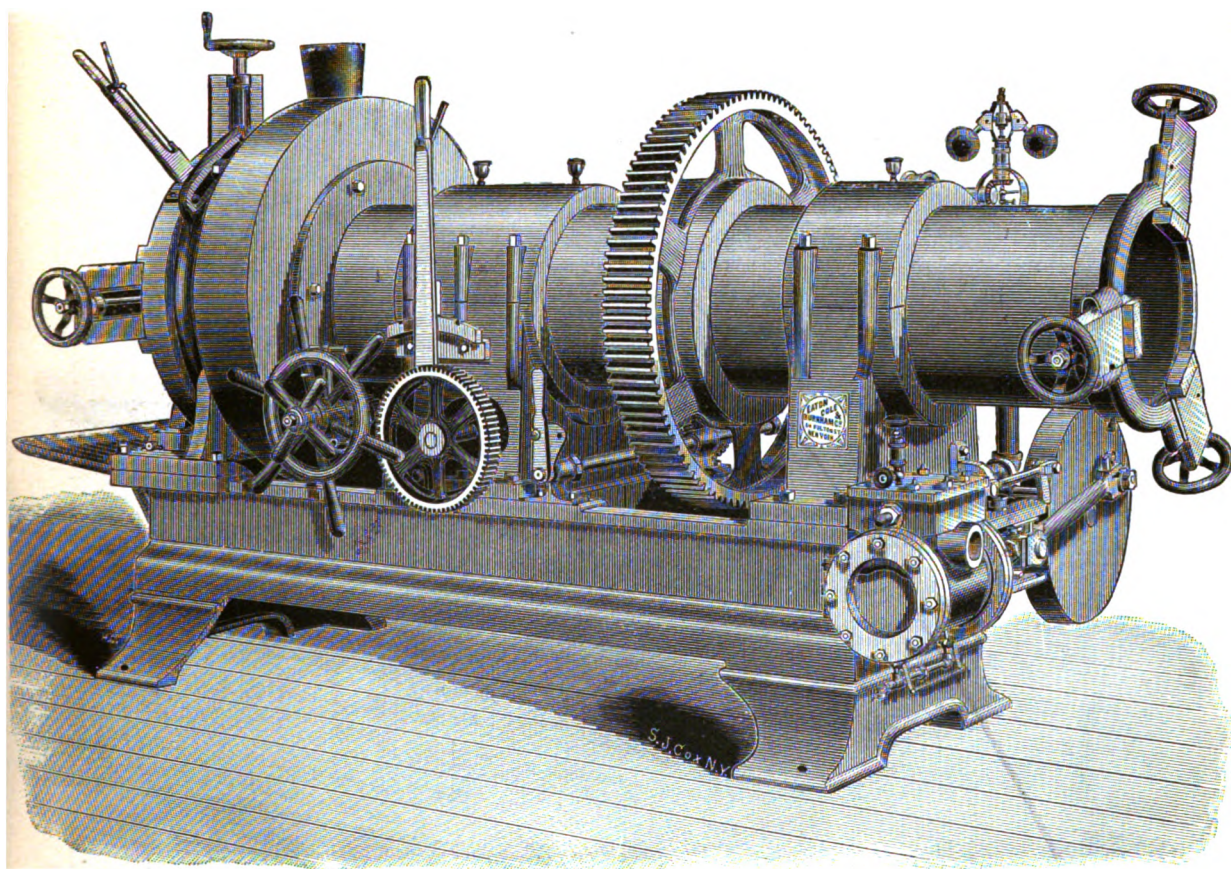
PIPE CUTTING AND THREADING MACHINE.

WITH ENGINE ATTACHMENT

WORKING SIDE.

No. 5

FIGURE 713.



This machine cuts and threads pipe from 6 inches to 12 inches, and is easy of operation.

The speed can be changed instantly, without stopping the machine, by the movement of a lever, thus saving time and the annoyance of changing gears. It is provided with an adjustable die head which, as in our other machines, can be adjusted almost instantly to cut any size pipe to which the dies are suited. The pipe being threaded, the dies can be opened, thus releasing the pipe and saving the time of backing off. The die head is bolted firmly to the bed, and the pipe being gripped rigidly in the chuck a crooked or drunken thread is impossible.

It has a positive feed, of compact and simple construction, operated by a clutch. It is impossible to spoil a thread, as is frequently done in machines where the operator depends upon his judgment in feeding. Either a concentric or independent jawed chuck is furnished, and the machine may also be had with countershaft to be driven with belt.

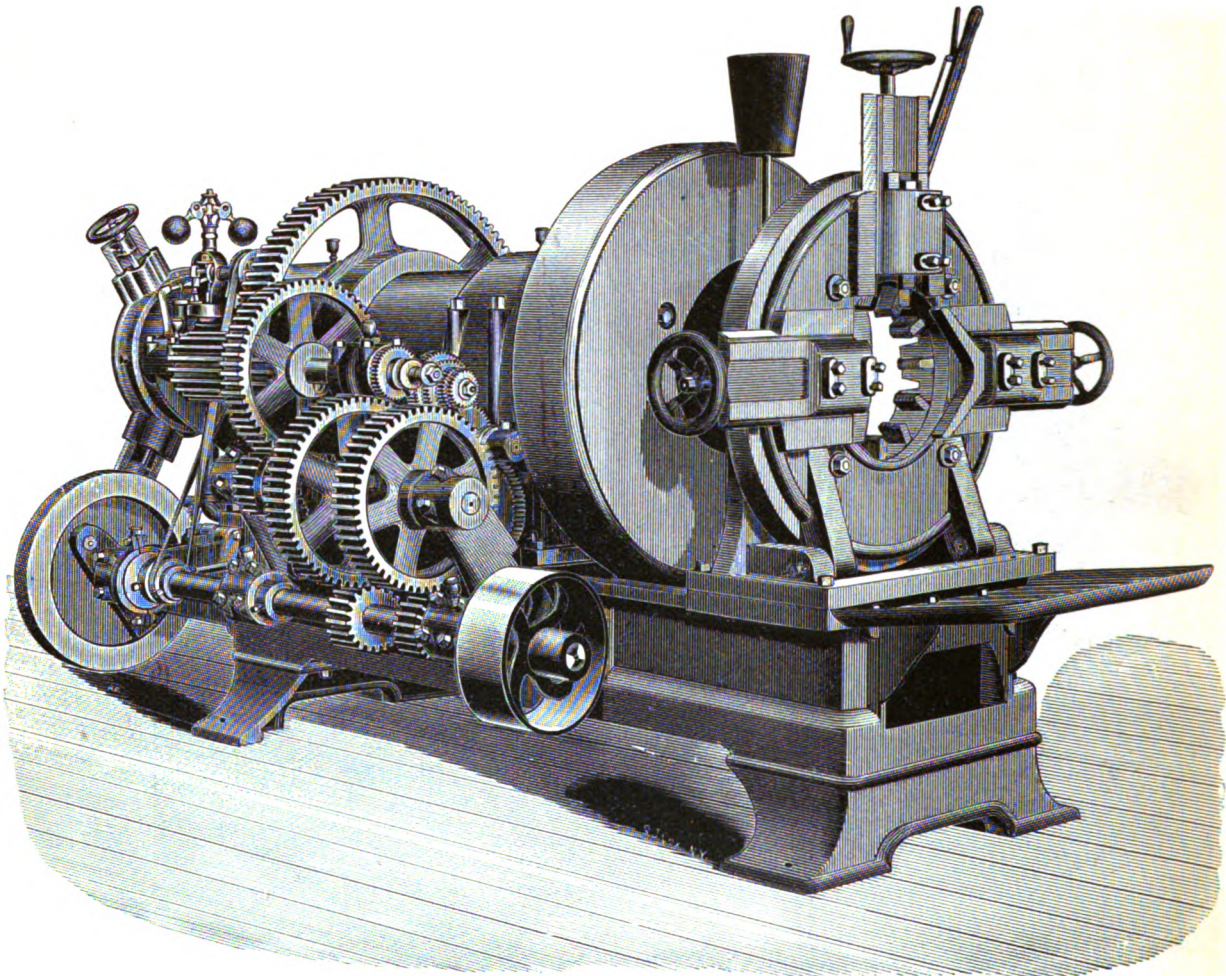
PIPE CUTTING AND THREADING MACHINE.

WITH ENGINE ATTACHMENT.

No. 5.

FIGURE 713 A.

REAR VIEW.



Gears, cut by the most improved machinery, are used, securing a smooth and noiseless running machine. We guarantee all parts of the best material and workmanship.

The main shaft runs all the time. The machine is started and stopped by a lever operating a clutch.

The small pulley on the right of the main shaft can be connected by a belt to over-head shafting to operate a drill press, grindstone, small pipe machine, or other light machinery.

Speed of countershaft, No. 5 Machine, 227 revolutions per minute.

Weight of No. 5 Machine (on skids for shipment), . . . 9,700 lbs.

No. 5 Machine threads 6 to 12 inch pipe and $11\frac{1}{8}$ inch casing.

DIES FURNISHED WITH NO. 5 MACHINE.

One Set Cutting	6 inch Pipe,	} 8 threads.
One " "	7 " "	
One " "	8 " "	
One " "	9 " "	
One " "	10 " "	
One " "	12 " "	

One Set Cutting	$6\frac{1}{4}$ inch Casing,	} 14 threads.
One " "	$6\frac{3}{8}$ " "	
One " "	$7\frac{1}{4}$ " "	

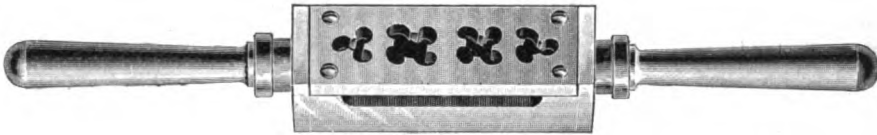
One Set Cutting	$6\frac{1}{4}$ inch Casing,	} $11\frac{1}{8}$ threads.
One " "	$6\frac{3}{8}$ " "	
One " "	$7\frac{1}{8}$ " "	
One " "	$8\frac{1}{4}$ " "	
One " "	$8\frac{3}{4}$ " "	
One " "	$9\frac{1}{8}$ " "	
One " "	$10\frac{3}{8}$ " "	
One " "	$11\frac{1}{8}$ " "	

SEE PREVIOUS PAGE FOR DESCRIPTION.

STOCKS AND DIES.

SOLID, SINGLE ROW OF DIES.

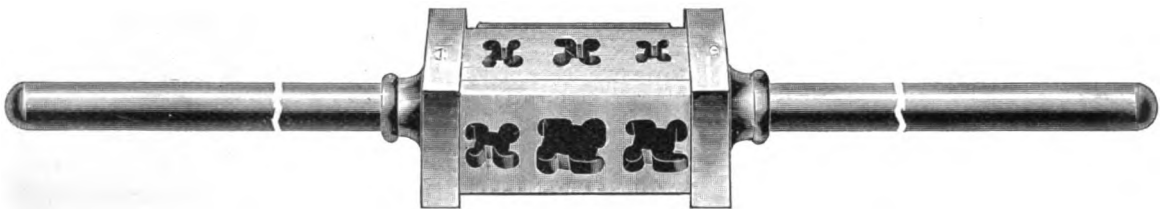
FIGURE 715



No. A.....Threads, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ inch Pipe.

SOLID, DOUBLE ROW OF DIES.

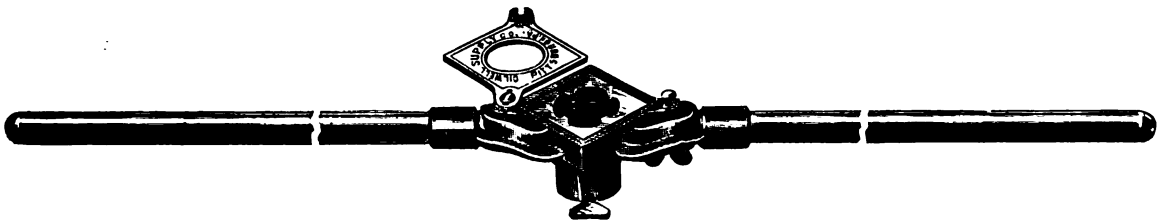
FIGURE 716.



No. AA.....Threads, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 inch Pipe.

MALLEABLE STOCKS WITH SOLID DIES.

FIGURE 718.



WITHOUT LEAD SCREW.

NUMBER.	SIZE OF DIES.	DIES FOR FOLLOWING SIZES OF PIPE.
0	2 inch square by $\frac{1}{2}$ inch thick.	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ inch.
1	$2\frac{3}{8}$ " " " $\frac{3}{4}$ " "	$\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 inch.
$1\frac{1}{2}$	3 " " " $\frac{3}{4}$ " "	$\frac{3}{4}$, 1, $1\frac{1}{4}$ inch.
$1\frac{3}{4}$	3 " " " $\frac{3}{4}$ " "	1, $1\frac{1}{4}$, $1\frac{1}{2}$ inch.

LEFT HAND DIES SAME SIZES.

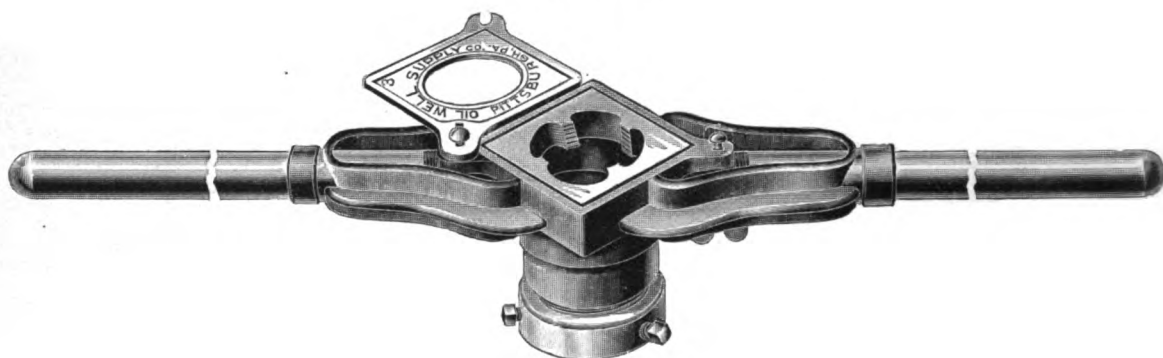
Solid Dies $\frac{3}{4}$ inch and larger are the Hill's Patent Dies.

The cutters in Hill's Dies being upon a spiral, the action in cutting threads is much easier than with the ordinary solid dies.

STOCKS AND DIES.

MALLEABLE STOCK WITH SOLID DIES.

FIGURE 721.

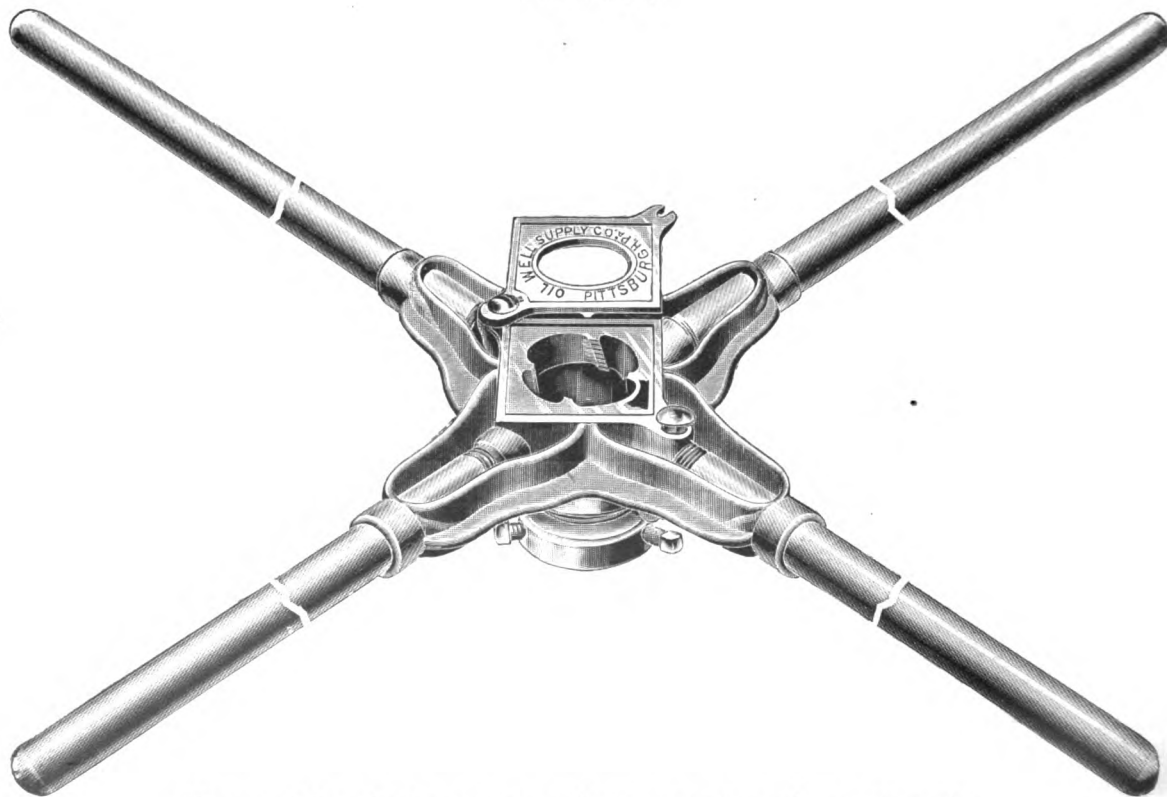


WITH LEAD SCREW.

NUMBER.	SIZE OF DIES.	DIES FOR FOLLOWING SIZES OF PIPE.
1 $\frac{3}{4}$	3 inches square by $\frac{3}{4}$ inch thick.	1, $1\frac{1}{4}$, $1\frac{1}{2}$ inch.
2	$3\frac{7}{8}$ " " " $\frac{7}{8}$ " "	$1\frac{1}{4}$, $1\frac{1}{2}$, 2 "
$2\frac{3}{4}$	4 " " " 1 " "	$1\frac{1}{4}$, $1\frac{1}{2}$, 2 "
3	5 " " " $1\frac{1}{4}$ " "	$2\frac{1}{2}$, 3 "

WITH FOUR HANDLES.

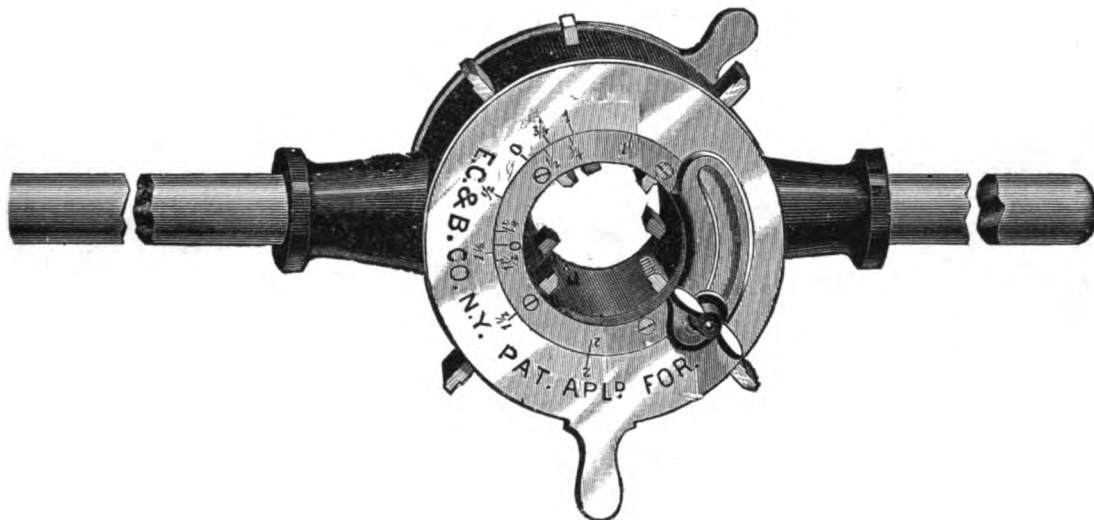
FIGURE 724.

No. 4.—Dies 5 inch square by $1\frac{1}{4}$ inch thick, for $2\frac{1}{2}$ and 3 inch Pipe.

ADJUSTABLE DIE STOCKS.

DIES AND GUIDES ADJUSTABLE.

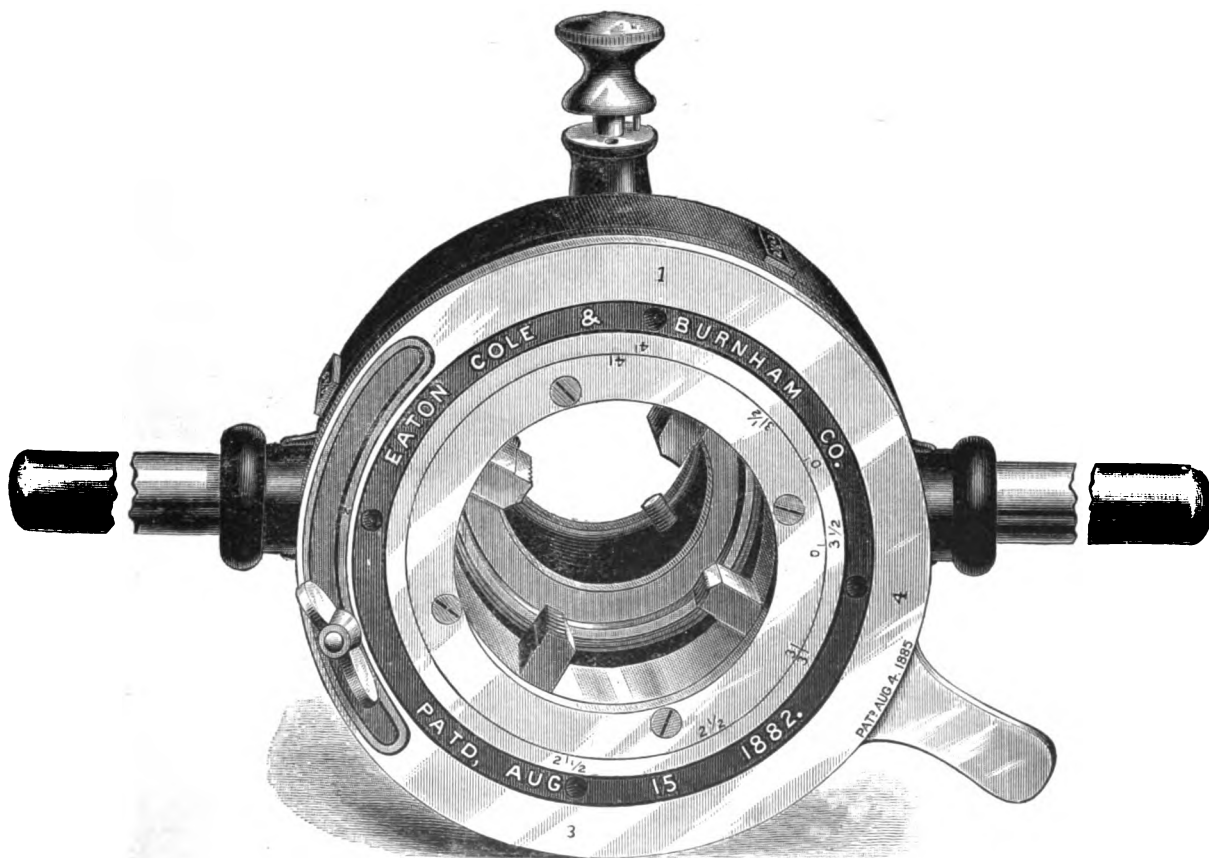
FIGURE 725 A.



No. 1 Threads..... $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 inch Pipe.

WITH RATCHET ATTACHMENT AND LEAD SCREW.

FIGURE 725 B.



No. 2 Threads..... $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4 inch Pipe.
 " $3\frac{1}{2}$ " 5 and 6 " "

RATCHET STOCKS.

ADJUSTABLE DIES, WITH RATCHET STOCK.

FIGURE 726.



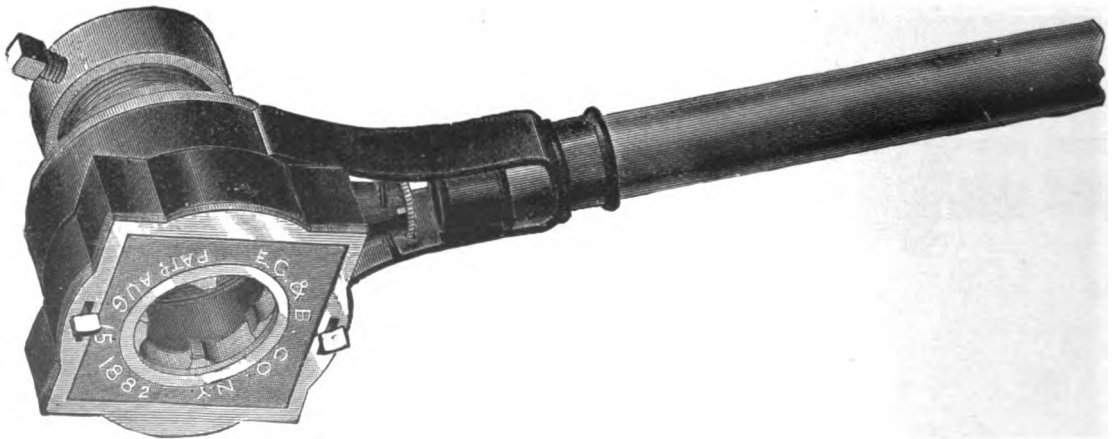
WITH LEAD SCREW.

No. 3 Threads..... 1, 1¼, 1½, 2 inch Pipe.

RATCHET STOCK FOR SOLID DIES.

SOLID DIES.

FIGURE 727.



WITH LEAD SCREW.

No. 4.—Threads..... 1¼, 1½, 2 inch Pipe.
Size of Dies..... 4 inches square by 1 inch thick.

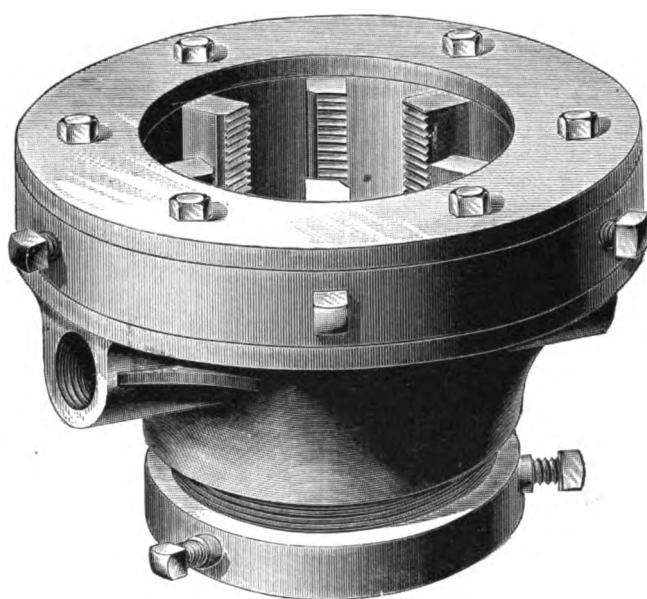
Threads can be cut much more easily with a Ratchet Stock than with the ordinary kind.

STOCK, WITH SECTIONAL DIES.

FOR LARGE PIPE.

CAST IRON BODY, BRASS LEAD SCREW, SIX DIES.

FIGURE 729.



Used largely for laying "Line Pipe." Can be used on the ground.

Numbers.....	10	11	12	13	14
Size of Pipe will thread....	4	5	6	8	10
Weight complete.....lbs.,	55	100	115	235	
Length of Handles.....inches,	40	48	48	72	96

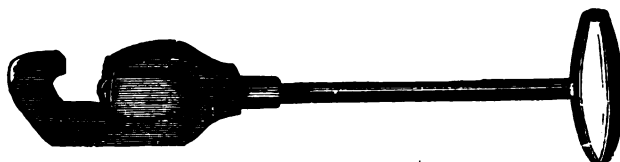
Nos. 10, 11 and 12 have two handles ; No. 13 and 14 one handle.

The dies in these stocks are slightly adjustable.

PIPE CUTTERS.

STANWOOD PIPE CUTTER.

FIGURE 730.



Number..... 1, 2, 3,
 Sizes of Pipe will cut..... $\frac{1}{8}$ to 1, 1 to 2, 2 to 3 inches.

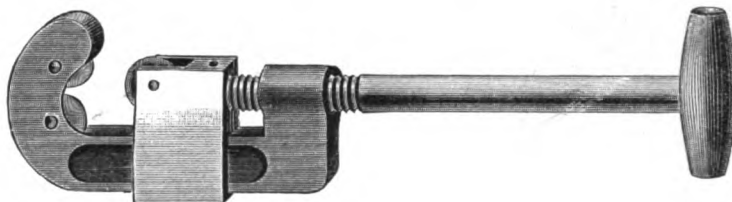
WHEEL FOR PIPE CUTTERS.

FIGURE 731.



THREE WHEEL PIPE CUTTER.

FIGURE 732.



Number..... 1, 2, 3, 4, 5, 6, 7,
 Sizes of Pipe will cut..... $\frac{1}{8}$ to 1, $\frac{1}{2}$ to 2, $1\frac{1}{2}$ to 3, 3 to 4, 4 to 6, 6 to 8, 9 to 12 inches.

SAUNDERS' PIPE CUTTER.

FIGURE 733.



Number..... 1, 2, 3,
 Sizes of Pipe will cut..... $\frac{1}{8}$ to 1, 1 to 2, 2 to 3 inches.

COMSTOCK PIPE CUTTER.

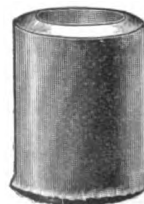
WITH ABRADING OR SCRAPING ATTACHMENT.

FIGURE 734.



SECTION OF PIPE.

THIS END CUT OFF BY THE COMSTOCK CUTTER.



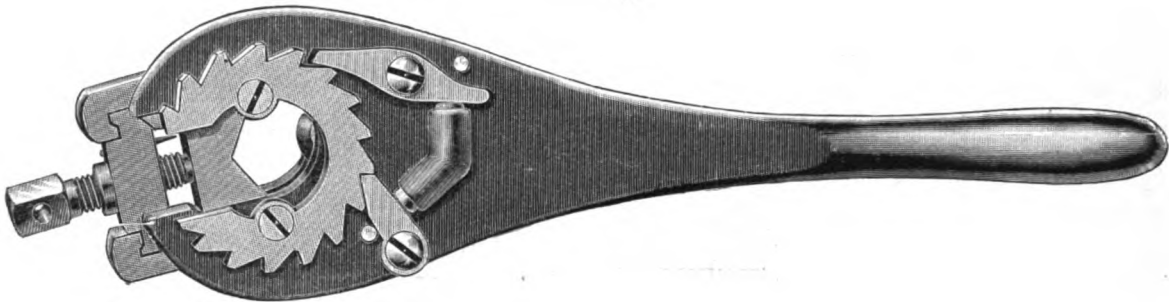
This end cut off by an old style cutter.

Number..... 1, 2, 3,
 Sizes of Pipe will cut..... $\frac{1}{8}$ to $1\frac{1}{4}$, 1 to $2\frac{1}{2}$, $1\frac{1}{4}$ to 4 inches.

PIPE CUTTER, DIES, &c.

MILLERS REVERSIBLE RATCHET PIPE CUTTER.

FIGURE 736.



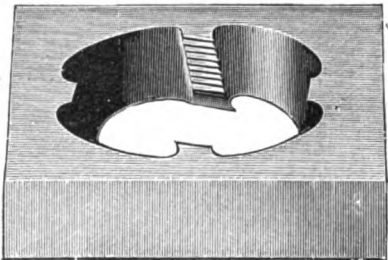
Number.....	0,	1,	1½,	2,	3,
Sizes of Pipe will cut....	⅛ to ¾,	½ to 1,	1 to 1½,	1¼ to 2,	2½ to 3 inch.

SOLID DIE FOR PIPE.

(HILL'S PATENT).

FIGURE 740.

(RIGHT OR LEFT).



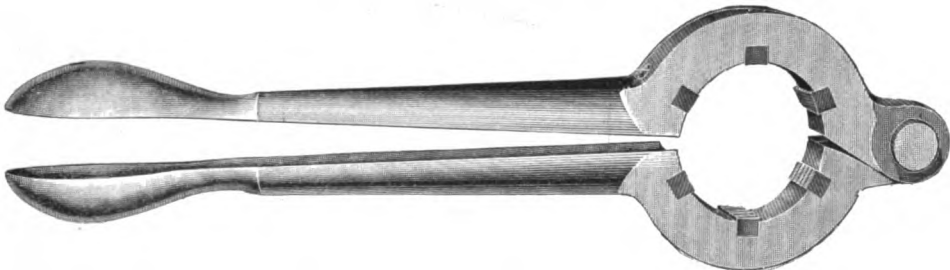
All Sizes from ⅛ to 3 inch inclusive.

THREAD CLEANER DIE.

(WHITE'S PATENT).

FIGURE 740 A.

FOR ANY SIZE OF PIPE OR CASING.

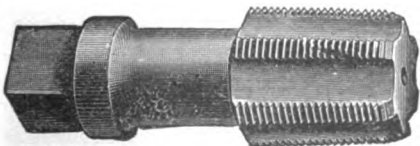


To clean threads that have become dirty or rusty, and to restore threads that have been damaged.

GAS PIPE TAP.

FIGURE 741.

(RIGHT OR LEFT).



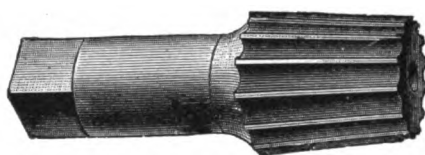
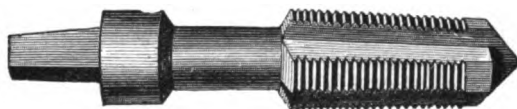
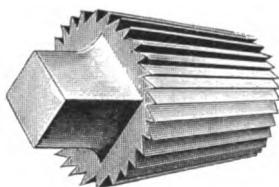
All Sizes from ⅛ to 3 inch.

GAS PIPE DRILL.

FIGURE 741 A.



All Sizes from ⅛ to 3 inch.

PIPE REAMERS, TAP, &c.**PIPE REAMER.****FIGURE 742.**All Sizes from $\frac{1}{8}$ to 3 inch.**HUMPHREY'S COMBINED DRILL, REAMER AND TAP.****FIGURE 742 A.**All Sizes from $\frac{1}{8}$ to 2 inch.**REAMER FOR PIPE MACHINE.****FIGURE 743.**

For 2 inch Pipe.

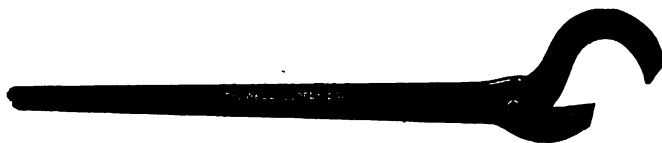
REAMER BLOCK FOR PIPE MACHINE.**FIGURE 744.**

Size of Block 4 x 1 inch. Hole in centre fits head of Reamer.

PIPE TONGS.

COMMON PIPE TONG.

FIGURE 745.



All Sizes from $\frac{1}{8}$ to 6 inch.

BROWN'S ADJUSTABLE TONG.

FIGURE 746.



No. 1 takes from $\frac{1}{8}$ to $\frac{3}{4}$ inch Pipe.

No. 1½ " $\frac{3}{8}$ to 1 " "

No. 2 " $\frac{1}{2}$ to 1¼ " "

No. 3 " 1 to 2 " "

No. 4 takes from 1½ to 3 inch Pipe.

No. 5 " 2½ to 4 " "

No. 6 " 3 to 5 " "

No. 7 " 4 to 7 " "

LAY'S PATENT TONG.

FIGURE 747.



All Sizes from $\frac{3}{4}$ to 12 inch.

Extra Bits for same.

"ACME" ADJUSTABLE TONG.

FIGURE 749.



No. 1 takes from $\frac{1}{8}$ to $\frac{3}{4}$ inch Pipe.

No. 2 " " $\frac{1}{4}$ to 1½ " "

No. 1½ takes from $\frac{1}{2}$ to 1¼ inch Pipe.

No. 3 " " $\frac{1}{2}$ to 2½ " "

No. 4 takes from $\frac{3}{4}$ to 4 inch Pipe.

PIPE TONGS.

BROCK'S PATENT CHAIN TONG.

FIGURE 751.

No. 1 takes from $\frac{1}{8}$ to 2 inch pipe.No. 2 takes from $\frac{1}{4}$ to 2½ inch pipe.

No. 3 " " 1 to 4 " "

No. 4 " " 2 to 8 " "

No. 5 takes from 3 to 12 inch pipe.

ROBBINS' PATENT CHAIN TONG.

FIGURE 752.



Size.	Length of Lever.	Size of Lever near Claw.	Diameter of Chain.	Average Weight.	Size of Pipe Adapted to.
No. 2.	27 inches.	1 $\frac{1}{8}$ inch.	$\frac{5}{8}$ inch.	7 lbs.	1 inch to 2 inch.
" 3.	3 feet.	1 $\frac{1}{4}$ "	$\frac{5}{8}$ "	12 "	1 $\frac{1}{4}$ " 4 "
" 4.	4 "	1 $\frac{1}{2}$ "	$\frac{3}{8}$ "	24 "	2 " 6 "
" 5.	5 "	1 $\frac{3}{4}$ "	$\frac{1}{2}$ "	33 "	2 $\frac{1}{2}$ " 8 "
" 6.	6 "	2 "	$\frac{5}{8}$ "	50 "	4 " 10 "
" 7.	7 "	2 $\frac{1}{2}$ "	$\frac{3}{4}$ "	100 "	4 " 16 "

CRUMBIE TONG.

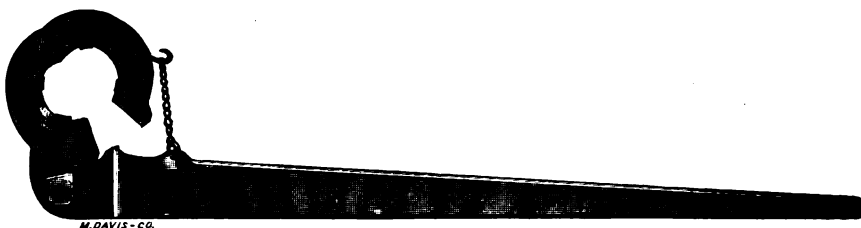
FIGURE 754.

All Sizes from $\frac{1}{4}$ inch to 3½ inch.

Extra Bits for same.

McCLEARY'S IMPROVED CRUMBIE TONG.

FIGURE 755.



All Sizes to Order.

PIPE TONGS.

JARECKI TONG.

FIGURE 756.



No. 0 takes from $\frac{1}{8}$ to $\frac{3}{4}$ inch pipe.

No. 1 " " $\frac{1}{8}$ to 1 " "

No. 2 " " $\frac{1}{4}$ to $1\frac{1}{2}$ " "

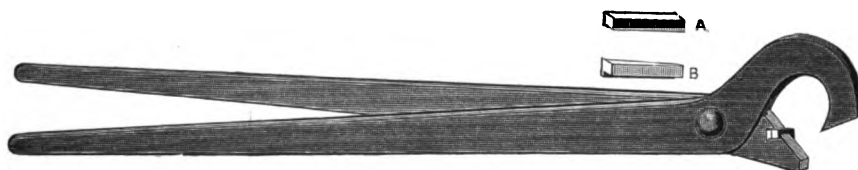
No. 3 takes from $\frac{1}{2}$ to $2\frac{1}{2}$ inch pipe.

No. 4 " " $\frac{3}{4}$ to $3\frac{1}{2}$ " "

No. 5 " " $2\frac{1}{2}$ to 6 " "

KLEIN'S PATENT TONG.

FIGURE 757.

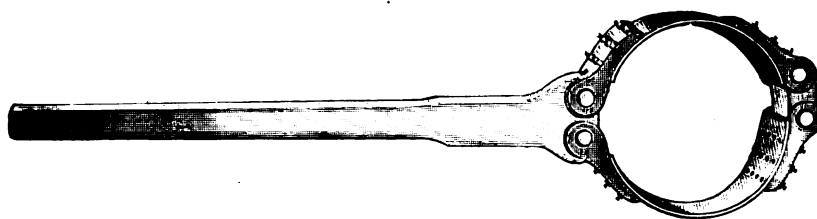


All Sizes from $\frac{3}{4}$ to 12 inch.

Extra Bits for same.

FRICTION TONG.

FIGURE 758.

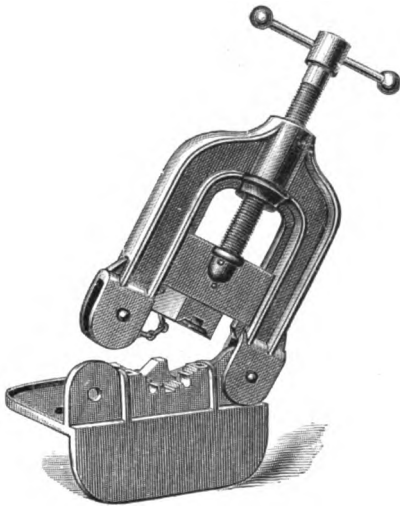


For Light Pipe, Casing, &c. It takes a very strong hold and does not dent or injure the tube. Any size to order.

PIPE VISES.

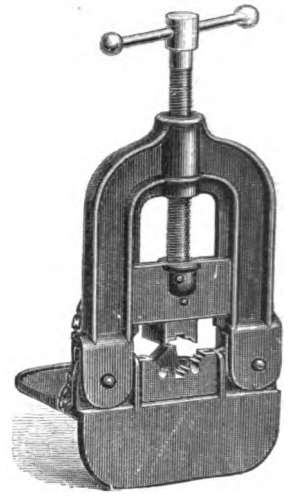
MALLEABLE IRON PIPE VISE.

FIGURE 760.



Open.

A very light, strong
and cheap Vise.



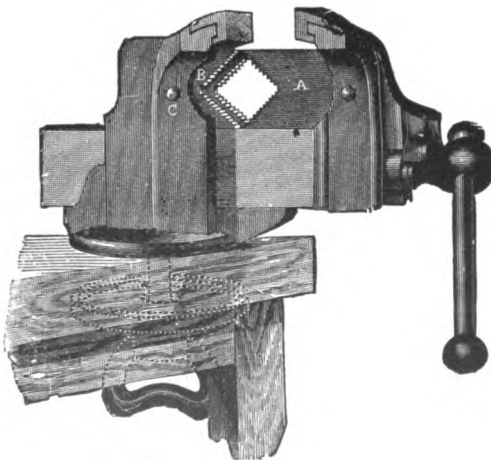
Closed.

No. 1 takes $\frac{1}{8}$ to 2 inch pipe, inclusive.

No. 2 " $\frac{1}{8}$ to 3 " "

SMITH'S COMBINATION VISE.

FIGURE 761.



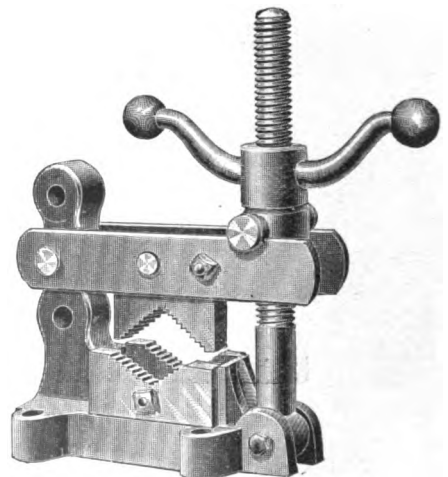
No. 1 takes $\frac{1}{8}$ to 2 inch pipe, inclusive.

No. 2 " $\frac{1}{8}$ to 3 " " "

No. 3 " $\frac{1}{4}$ to 4 " " "

DOUBLE BAR PIPE VISE

FIGURE 762.



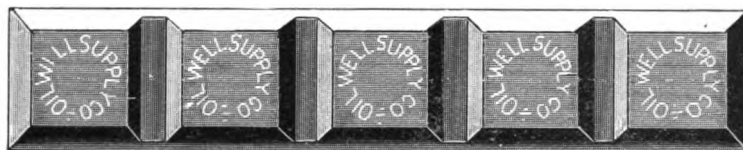
No. 2 A.—takes $\frac{1}{8}$ to 4 inch pipe, inclusive.

No. 3 A.— " $1\frac{1}{2}$ to 6 " " "

GAUGES, &c.

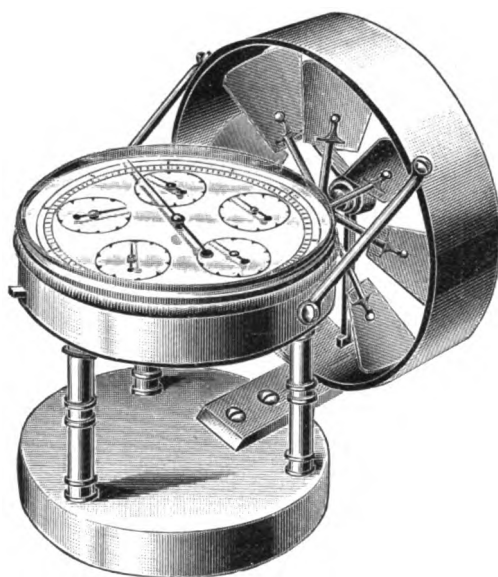
BABBITTS METAL.

FIGURE 770.



ANEMOMETER.

FIGURE 772.



For measuring the velocity of currents of Air or Gas. Reading to Ten Million feet, with Disconnecter.

SYPHON FOR STEAM GAUGE.

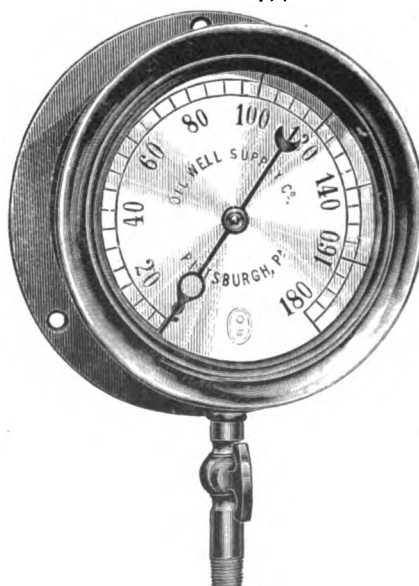
(Formerly Figure 775).

FIGURE 773.

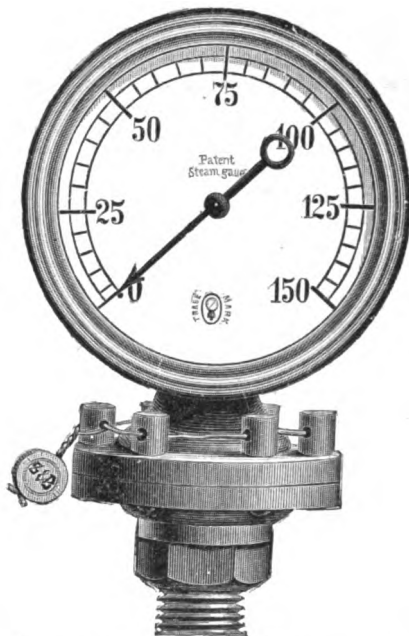


STEAM GAUGE.

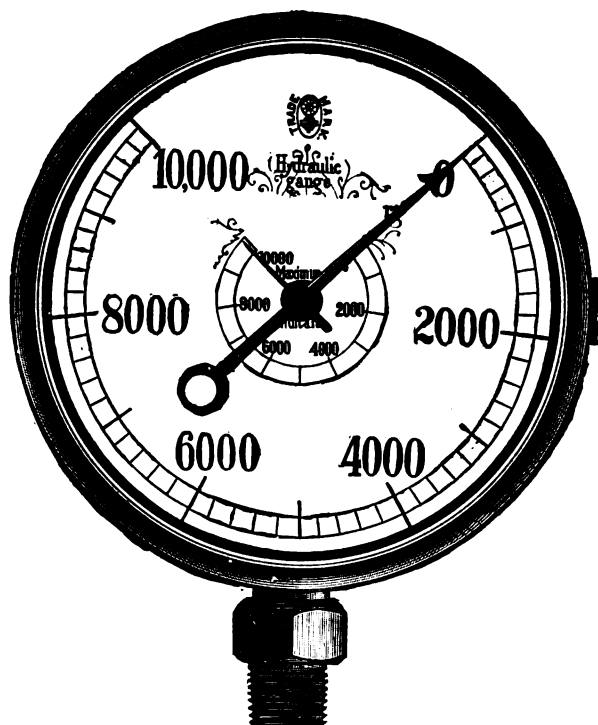
FIGURE 774.



With Iron or Brass Case.

GAUGES.**PRESSURE GAUGE.****GERMAN STYLE.****WITH CORRUGATED STEEL DIAPHRAGM SPRING****FIGURE 774 A.**

For any pressure up to 300 lbs. per square inch. This gauge must be connected by a syphon.

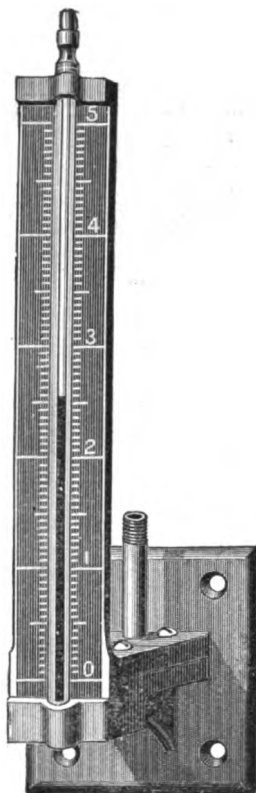
HYDRAULIC GAUGE.**WITH STEEL TUBE SPRING.****FIGURE 774 B.**

For any pressure up to 20,000 lbs. per square inch.

GAUGES.

MERCURY GAUGE.

FIGURE 774 C.



For from 5 lbs. pressure to 25 lbs. pressure.
 Indicating pressure in pounds and ounces.

SYPHON GAUGE.

FIGURE 774 D.

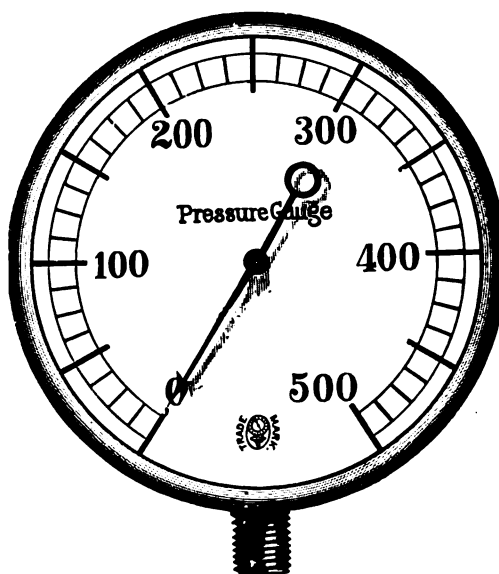


To be half filled with mercury, water or
 other liquid.
 Showing pressure in inches.

PRESSURE GAUGE.

AMERICAN STYLE.

FIGURE 774 F.



With Steel Tube Spring for any pressure. With
 Brass Tube Spring up to 500 lbs. per square inch.

GAS FITTERS' GAUGE.

FIGURE 774 E.

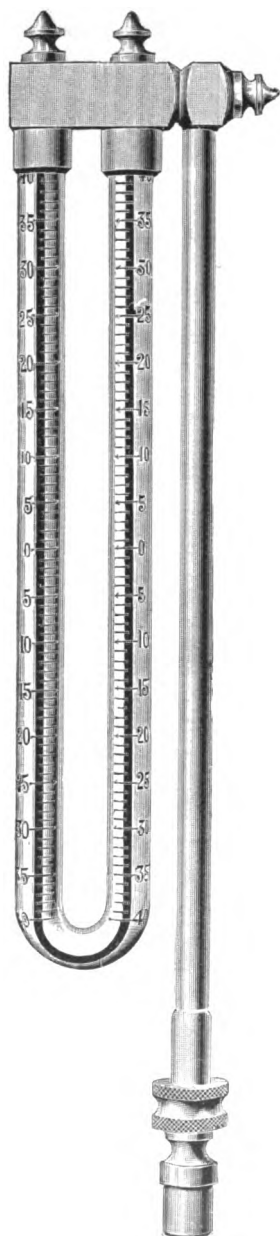


3-inches diameter, showing pressures up
 to 15 lbs. per square inch.

GAUGES.

HICKS GAUGE.

FIGURE 774 G.

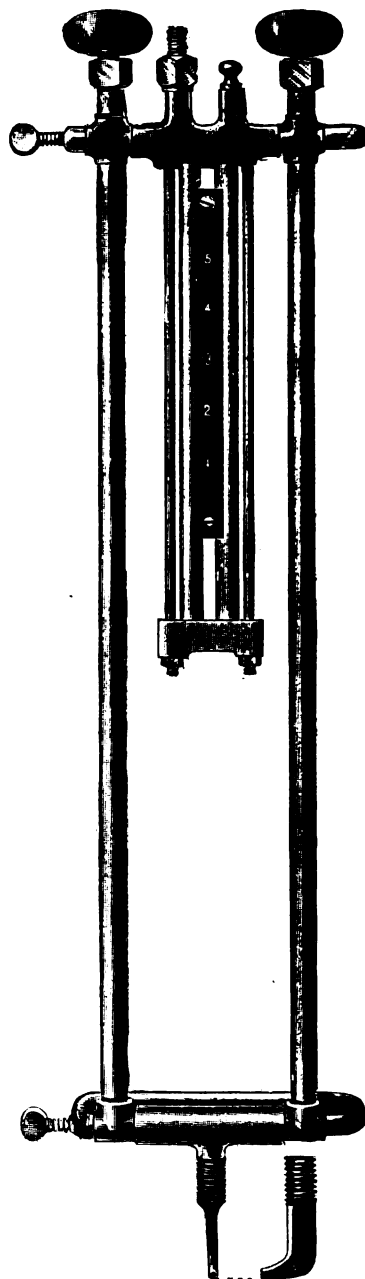


To be filled to the zero line with liquid (mercury, water, &c.,) to measure pressures.

Graduated in tenths of an inch.

ROBINSON'S PITOT TUBE GAUGE
FOR MEASURING GAS.

FIGURE 774 H.

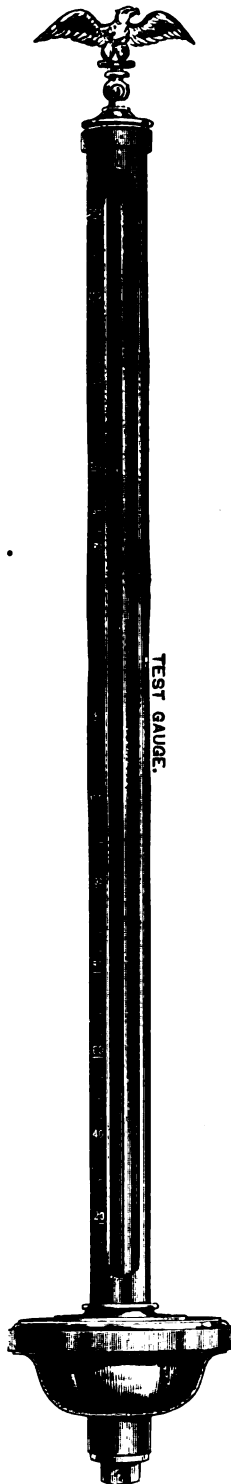


This instrument will quickly and accurately measure the quantity of gas delivered by any pipe line or any gas well. Special description on application.

GAUGES.

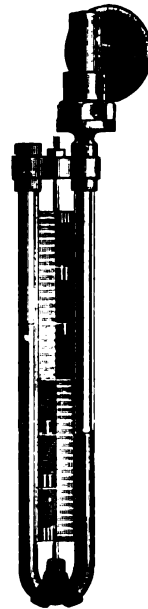
SHAW'S DIFFERENTIAL GAUGE.

FIGURE 774 I.



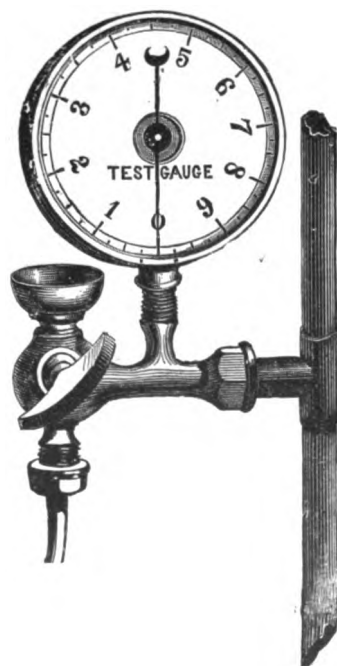
CHAPMAN GAUGE.

FIGURE 774 J.



GAS FITTERS' TEST GAUGE AND ETHER CUP.

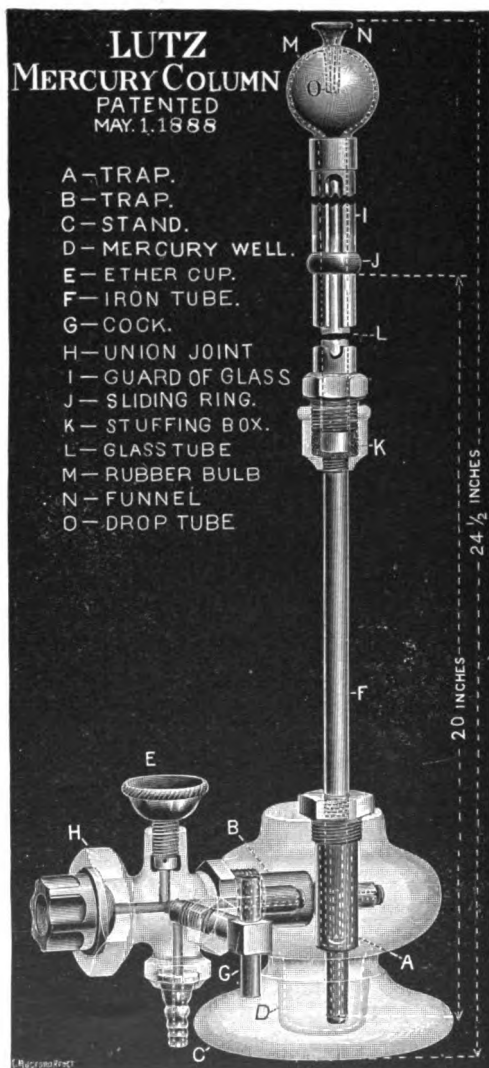
FIGURE 774 K



MERCURY COLUMN.

"LUTZ'S" MERCURY COLUMN AND ETHER CUP.

FIGURE 774 L.

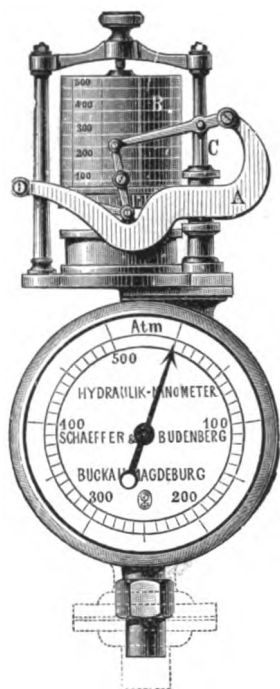


This is so constructed that the mercury cannot be lost out no matter what position the instrument is placed in.

RECORDING GAUGE.

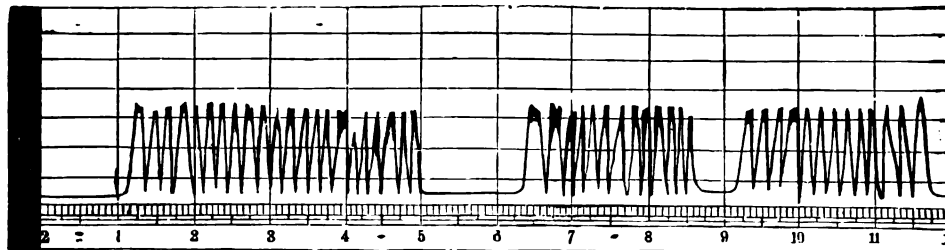
PATENT RECORDING GAUGE FOR STEAM AND HYDRAULIC PRESSURE.

FIGURE 774 M.



RECORD CARD.

FIGURE 774 N.

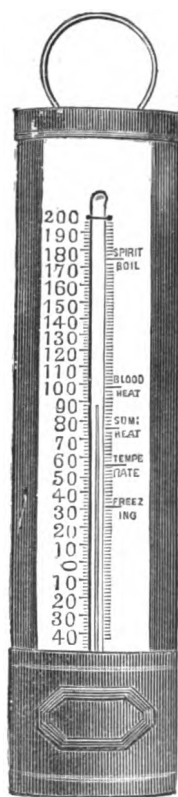


This instrument furnishes a record of the Variations of Pressures in Steam Boilers, Hydraulic Presses, Pumping Engines, Oil Lines, etc. It combines a Pressure Gauge, a Clock Movement and a recording Mechanism, which transmits the motion of the Gauge spring to a writing pencil. The figures *I* to *XII* engraved on the lower end of the Drum form the Dial of the Clock ; while the Drum is moved by the Clock Movement, the recording Pencil is moved by the Gauge spring up and down according to Pressure, marking curves on the Record Card as shown in Figure 774 N, thus recording the variation of the pressure. The instrument is placed in a glass case to keep it from dust and to prevent tampering.

THERMOMETERS.

TIN CASE.

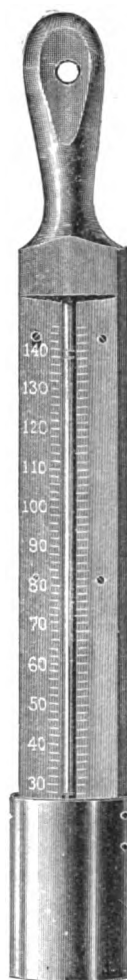
FIGURE 775 A.



For Ordinary Use.

WOOD CASE.

FIGURE 775 B.



For ascertaining Temperature of Oil. The bottom cup holds the liquid to be tested.

CHISELS, PICK, &c.

COLD CHISEL.

FIGURE 776.



CROW BAR.

FIGURE 777.



SOLID STEEL PUNCH.

FIGURE 778.



SPLITTING CHISEL.

FIGURE 779



With Handle when ordered.

MATTOCK.

FIGURE 780.



PICK.

FIGURE 781.



MELTING LADLE.

FIGURE 782.



BELT HOOK.

FIGURE 783.



BELT PUNCH.

FIGURE 784.

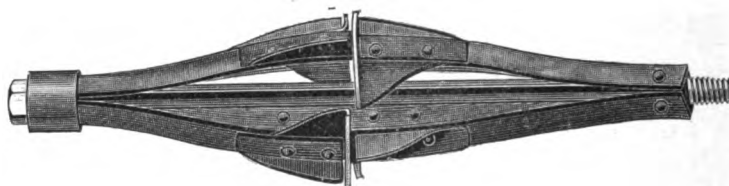


See Figure 78 B.

FLUE SCRAPER, EXPANDERS, &c.

FLUE SCRAPER.

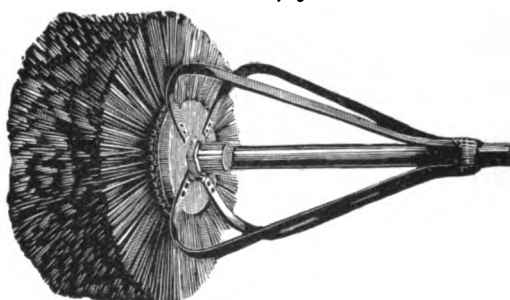
FIGURE 785.



All Sizes from 2 to 4 inch.

FLUE BRUSH.

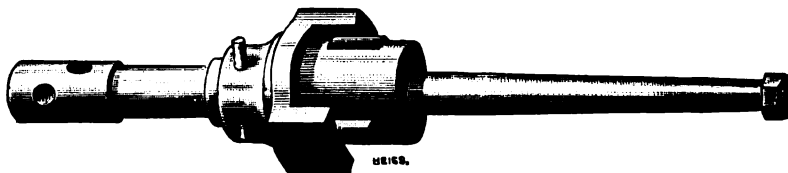
FIGURE 785 A.



All Sizes from 6 to 18 inch.

DUDGEON'S TUBE EXPANDER.

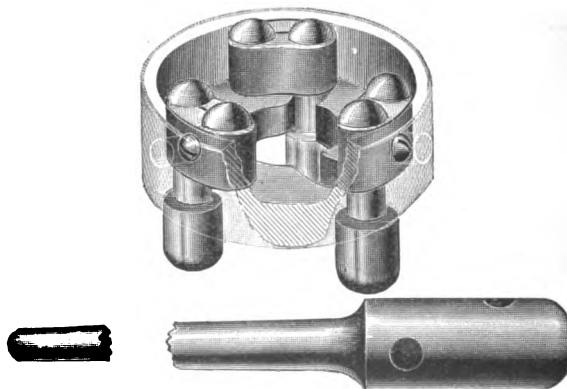
FIGURE 785 B.



All Sizes from 1 to 6 inch.

GILES' ADJUSTABLE THREE ROLLER TUBE EXPANDER.

FIGURE 785 C.



ESPECIALLY ADAPTED FOR SMALL SHOPS, AND AS A JOBBING TOOL IN LARGE ESTABLISHMENTS.

No. 100—Expands 2, 2 $\frac{1}{4}$, 2 $\frac{1}{2}$, 2 $\frac{3}{4}$ and 3 inch tubes.

No. 200— " 3, 3 $\frac{1}{4}$, 3 $\frac{1}{2}$, 3 $\frac{3}{4}$ " 4 " "

Each expander is furnished with five sets of rollers, one set for each size tube, thus getting the adjustment in the rollers instead of in the pin. This allows the pins to be made with the usual taper and gives better results than where pins are made with an extra taper.

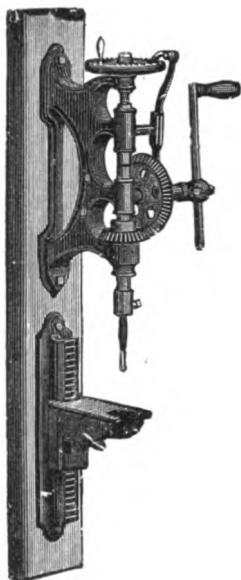
PULLEY BLOCK, DRILLS, &c.

DIFFERENTIAL
PULLEY BLOCK.

FIGURE 790.

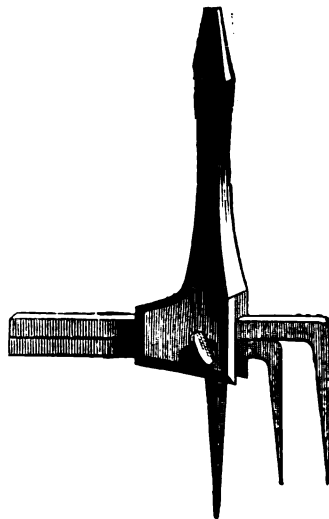
SELF FEEDING
UPRIGHT DRILL.

FIGURE 792.



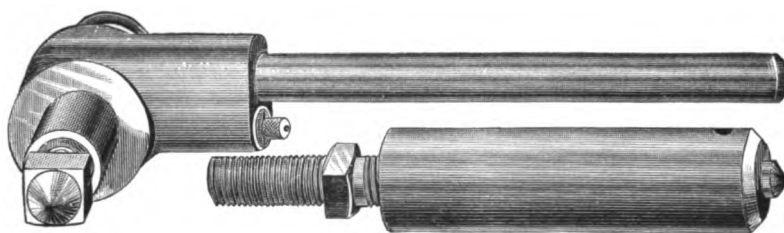
WASHER CUTTER.

FIGURE 793.



RATCHET DRILL.

FIGURE 794.



TAPS.

BLACKSMITH.

FIGURE 795.



MACHINIST, TAPER.

FIGURE 795 A.



TAPS, WRENCH, &c.

TAPS.

MACHINIST, PLUG.

FIGURE 795 B.



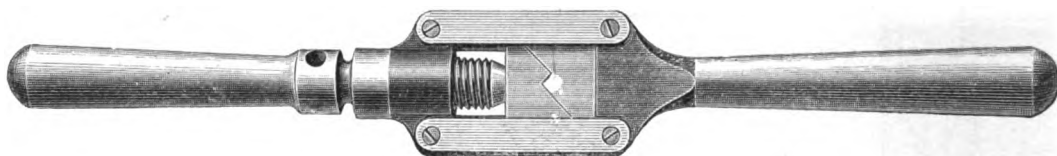
MACHINIST, BOTTOM.

FIGURE 795 C.



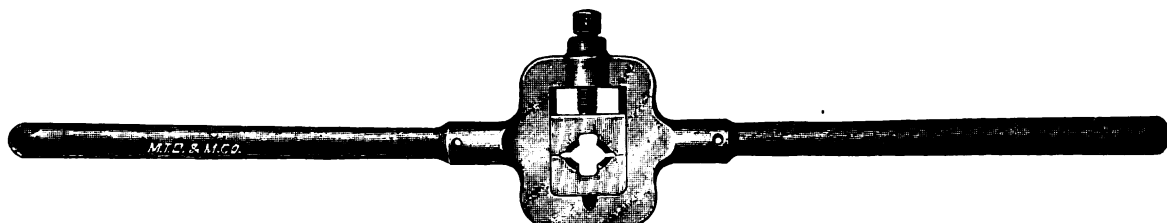
TAP WRENCH.

FIGURE 795 D.



MACHINIST STOCK AND DIES.

FIGURE 795 E.



WOODEN PULLEY BLOCKS.

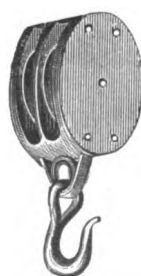
SINGLE.

FIGURE 796.



DOUBLE.

FIGURE 797.



TRIPLE.

FIGURE 798.



With or Without Beckets.

SNATCH AND PULLEY BLOCKS.

SNATCH BLOCKS.

SINGLE.

FIGURE 799.

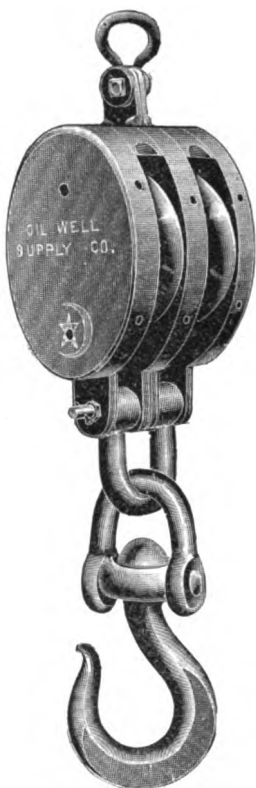
(ALSO FIGURE 312).



DOUBLE.

FIGURE 799 A.

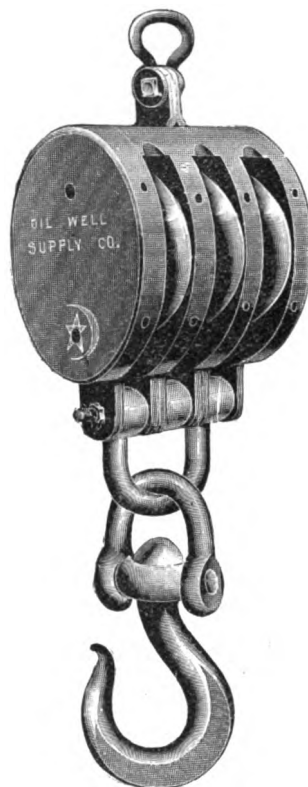
(ALSO FIGURE 312 A).



TRIPLE.

FIGURE 799 B.

(ALSO FIGURE 312 C).



With or Without Swivel Hooks.

IRON PULLEY BLOCKS.

SINGLE.

FIGURE 800.



DOUBLE.

FIGURE 801.



TRIPLE.

FIGURE 802.

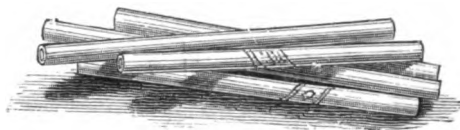


With or Without Becketts.

GAUGE GLASSES, &c.

GAUGE GLASSES.

FIGURE 803.



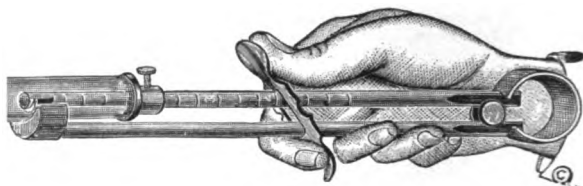
For Figures 625, 625A and 631.

GAUGE GLASS CUTTERS.

FIGURE 803 A.

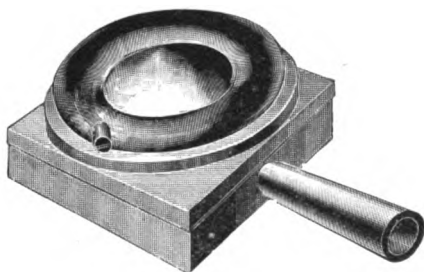


FIGURE 803 B.



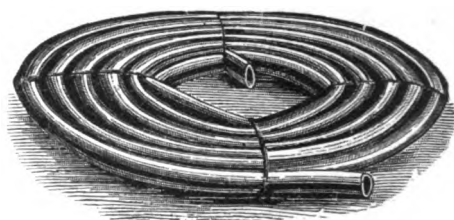
TUYERE IRON FOR FORGE.

FIGURE 804.



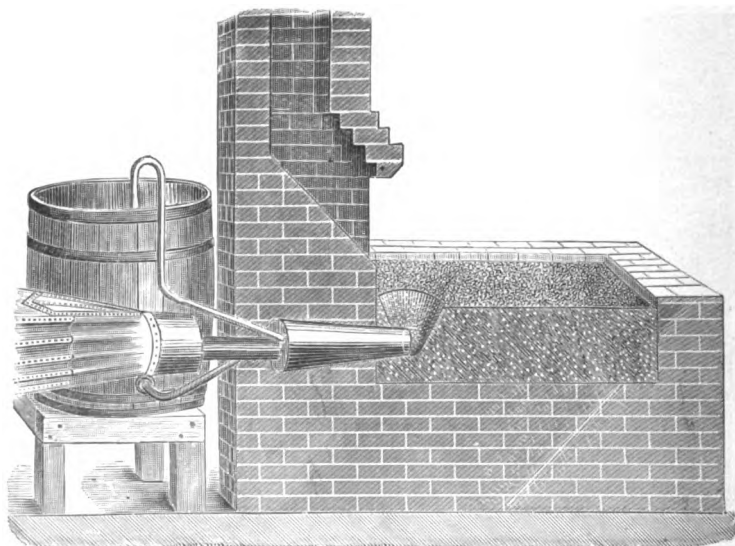
HOSE.

FIGURE 805.



WATER TUYERE FOR FORGE.

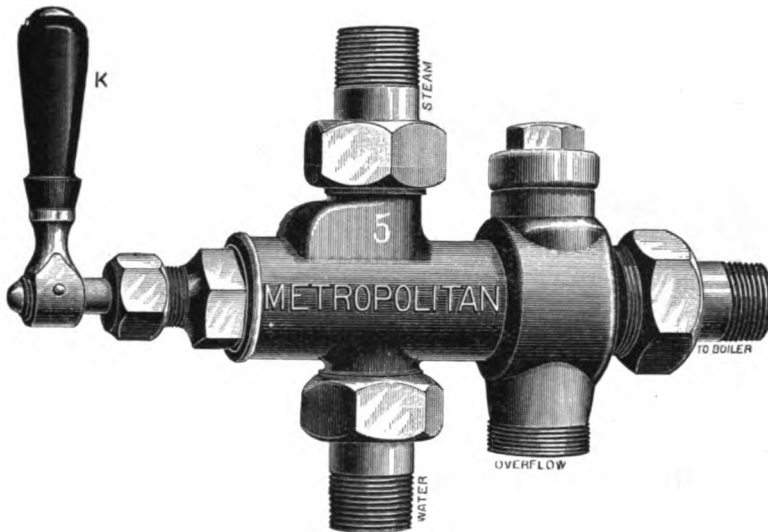
FIGURE 804 A.



A current of water flows around the tuyere keeping it comparatively cool.

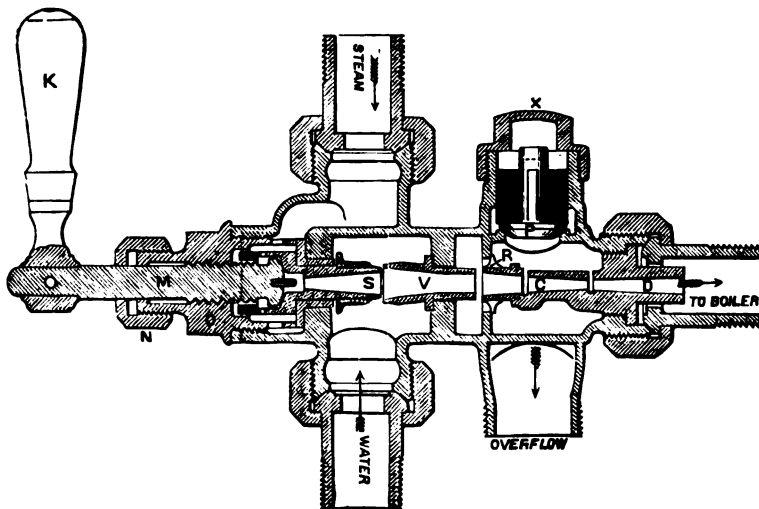
METROPOLITAN INJECTOR.

FIGURE 807.



SECTION.

FIGURE 808.



PARTS COMPRISING THE METROPOLITAN INJECTOR.

- S.—Steam Jet.
- V.—Suction Jet.
- C-D.—Combining and Delivery Tube.
- R.—Ring or Auxiliary Check.
- P.—Overflow Valve.
- O.—Steam Plug.
- M.—Steam Valve and Stem.
- N.—Packing Nut.
- K.—Steam Valve Handle.
- X.—Overflow Cap.

REPAIRS.

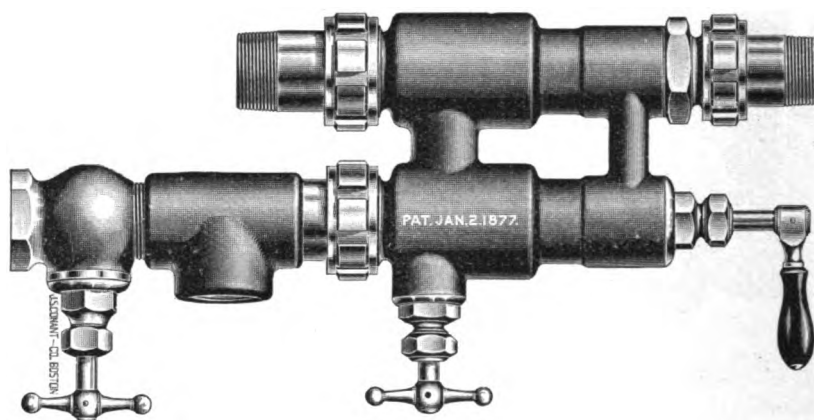
Parts for repairs can be had at low prices. Orders for parts must state the size, also the *factory or serial number* of the Injector, care being taken to call the part by the name in the list.

By removing the overflow cap X, the valve P may be ground to its seat by turning it back and forth with a screw driver. Should the working parts become coated with lime, stand them over night in a solution of one part muriatic acid to ten parts water.

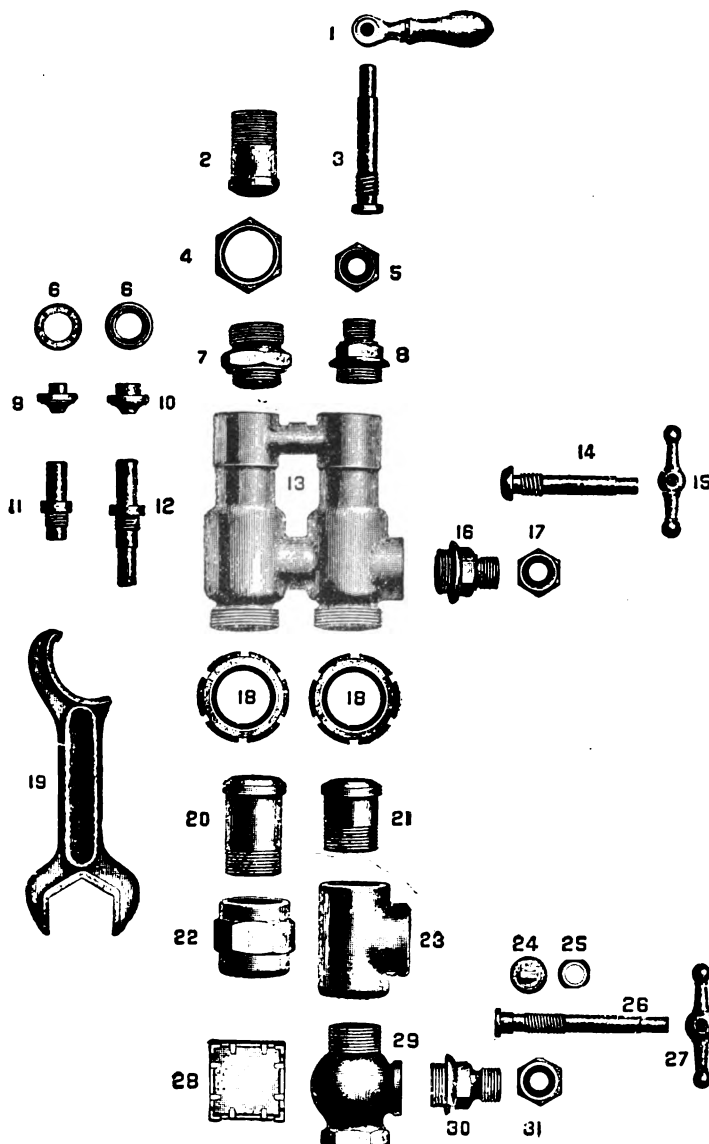
HANCOCK INSPIRATOR.

FIGURE 809.

(FORMERLY FIGURE 787).



LIST OF INSPIRATOR PARTS.



- 1 Shank Handle.
- 2 Steam Nipple.
- 3 Long Stem.
- 4 Steam Coupling.
- 5 Packing Nut.
- 6 and 6 Binding Rings.
- 7 Union.
- 8 Top Bonnet.
- 9 Lifter Steam Jet.
- 10 Forcer Steam Jet.
- 11 Lifter Tube.
- 12 Forcer Tube.
- 13 Barrel.
- 14 Short Stem.
- 15 Ball Handle.
- 16 Overflow Bonnet.
- 17 Packing Nut.
- 18 and 18 Suction and Feed Couplings.
- 19 Spanner Wrench.
- 20 Suction Nipple.
- 21 Feed Nipple.
- 22 Suction Pipe Coupling.
- 23 Tee.
- 24 Overflow Valve Swivel.
- 25 " " " Nut.
- 26 " " " Stem.
- 27 " " " Handle.
- 28 Strainer.
- 29 Overflow Valve Body.
- 30 " " Bonnet.
- 31 " " Packing.

Parts are shown as near as possible to their places in complete Inspirator.

Nos. 1, 3, 5 and 8—together make Top Bonnet complete, or No. 32.

" 14, 15, 16 and 17—together make Overflow Bonnet complete, or No. 33.

" 24, 25, 26, 27, 29, 30 and 31 together make Overflow Valve complete, or No. 34.

" 9, 10, 11 and 12 together make Set of Jets complete, or No. 35.

" 18, 20 and 22—together make Suction Connection complete, or No. 36.

" 18, 21, 23 and 34—together make Overflow complete, or No. 37.

JET PUMPS OR EJECTORS.

STEAM JET PUMP.

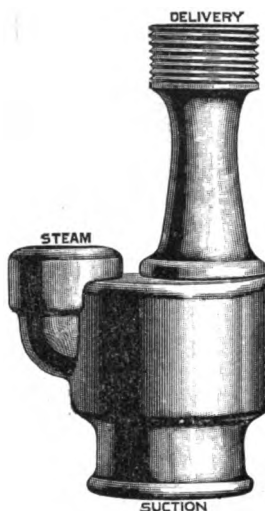
FIGURE 811.

(FORMERLY FIGURE 789).



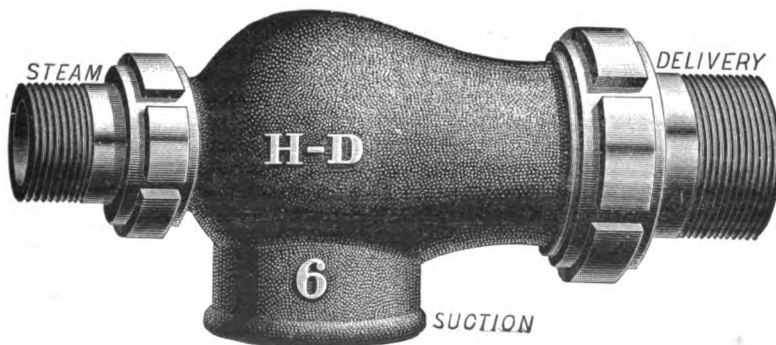
DRIVE WELL JET PUMP.

FIGURE 812.



THE H-D EJECTOR OR JET PUMP.

FIGURE 813.



These Ejectors are used for lifting and forcing water and liquids of all kinds, and are especially adapted for use as Bilge Pumps on Steam Boats.

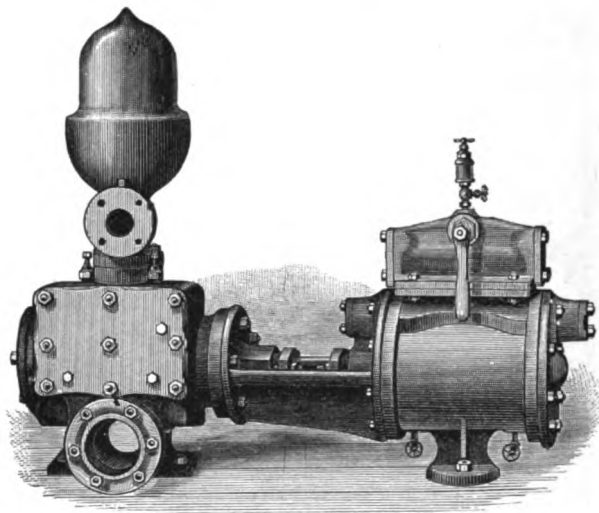
STEAM PUMPS.

FOR OIL OR WATER.

(CAMERON'S PATENT).

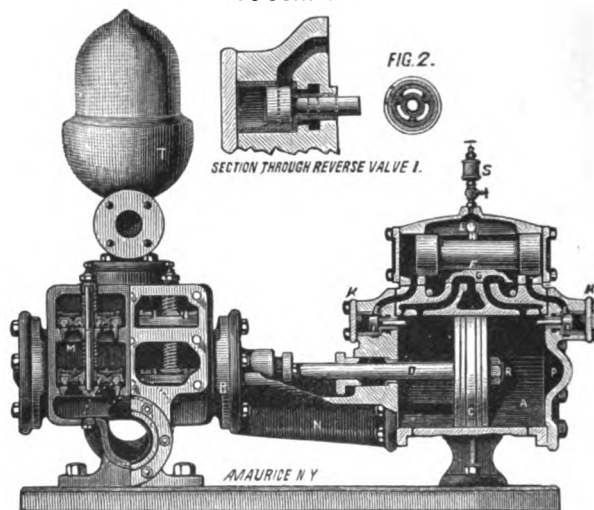
FIGURE 815.

(FORMERLY FIGURE 786).



SECTION.

FIGURE 816.



EXPLANATION.—A is the steam cylinder; C, the piston; D, the piston rod; L, the steam chest; F, the plunger; G, the slide valve; H, a starting bar connected with a handle on the outside; I I, are the reversing valves, and K K the bonnets over the reversing valves; N is the body piece connecting the steam and water cylinders; B is the water cylinder with the valve chest bonnet removed; M is a valve seat shown in section—the valve over it is also shown in section; T is the discharge air vessel. Figure 2 shows an enlarged sectional view of reversing valve chamber with phosphor bronze lining.

OPERATION.—Suppose the steam piston C, moving from right to left; when it reaches the reversing valve I, it opens it and exhausts the space on the left hand end of the plunger F, through the passage E, which leads to the exhaust pipe; the greater pressure inside of the steam chest changes the position of the plunger F and slide valve G, and the motion of the piston C is instantly reversed. The same operation repeated at each stroke makes the motion continuous. The reversing valves I I are closed by a pressure of steam on their larger ends, conveyed by an unseen passage direct from the steam chest.

DIRECTIONS.—When a pump is first connected, remove the bonnets K K and valves I I, and blow steam through to remove any dirt or chips that may have lodged in the pipes; then clean and replace them.

Except when arranged for particular duty (pumping oil, acid, &c.) the pump piston is fitted with square canvas packing. Care should be taken that it is not put in too large, and that the ends of the pieces do not meet by, from an eighth to a quarter of an inch, as it swells when wet and would render the piston difficult to move. It may be reduced by laying it on a flat surface and hammering it. When canvas packing cannot be obtained, hemp packing, plaited hard, may be used. The advantage of a piston fitted with vegetable packing over a metallic piston, is that the packing can be easily renewed.

In replacing the India rubber joints of the steam cylinder, be careful to cut openings corresponding with the ports.

USE ONLY GOOD LUBRICATING OIL IN THE STEAM CYLINDER, KEEP THE WATER PISTON AND STUFFING BOXES NICELY PACKED, AND TAKE GOOD CARE OF YOUR STEAM PUMP.

STEAM PUMPS.

THE SNOW DUPLEX, FOR GENERAL SERVICE.

FIGURE 818.

SMALL SIZE.

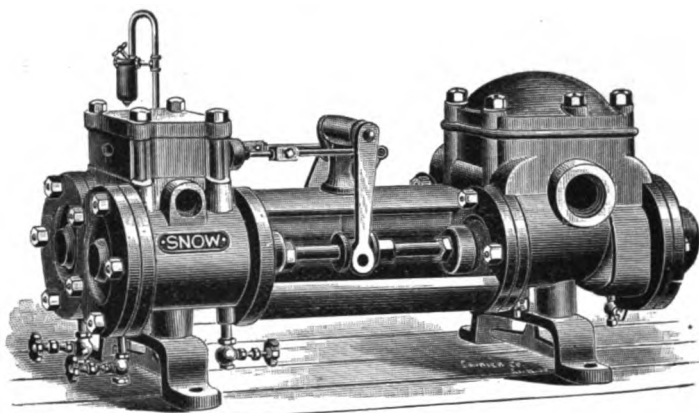
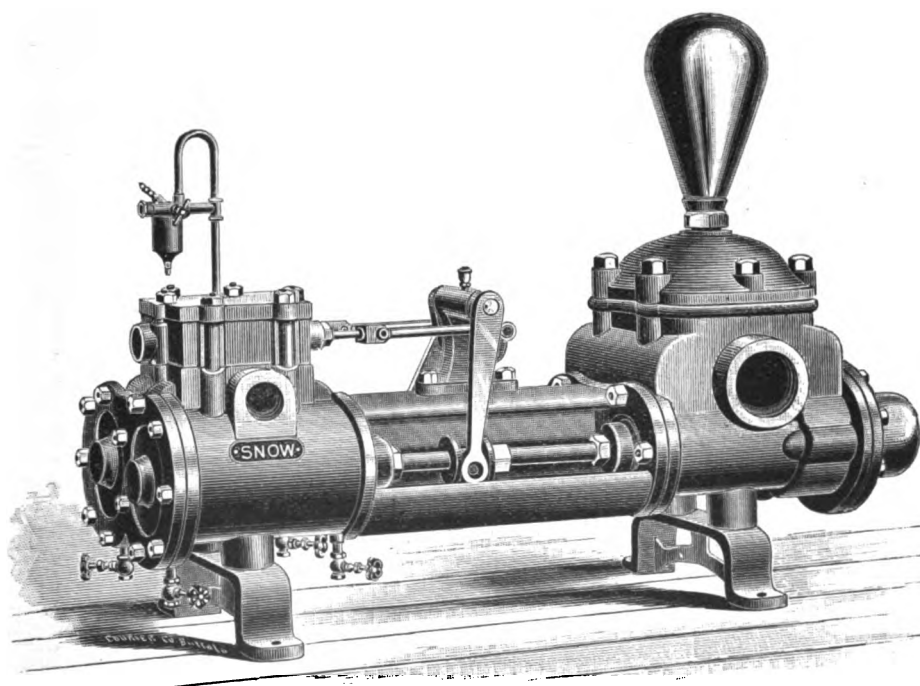


FIGURE 818 A.

MEDIUM SIZE, WITH AIR CHAMBER.



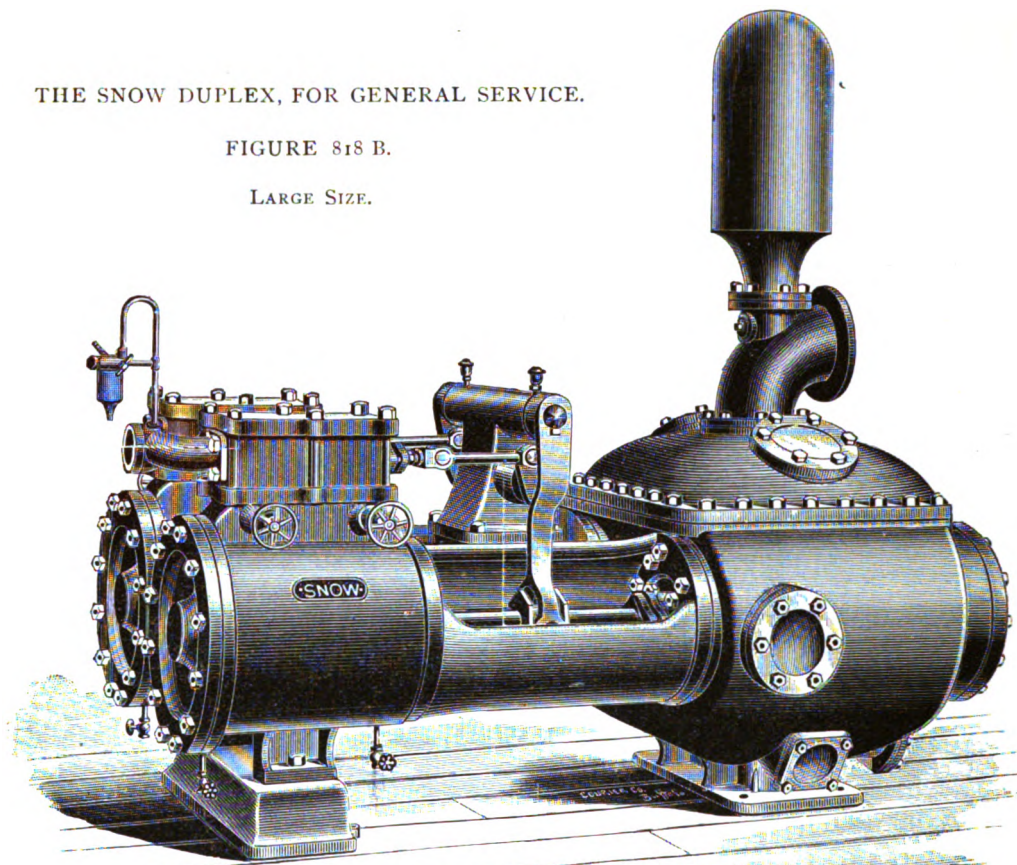
See next page for description and sizes.

STEAM PUMP.

THE SNOW DUPLEX, FOR GENERAL SERVICE.

FIGURE 818 B.

LARGE SIZE.



Figures 818, 818 A and 818 B represent the standard design of the Snow Duplex Steam Pumps. They are intended for all service when the requirements do not exceed a working pressure of 150 lbs. per square inch. These pumps are fitted with two double-acting plungers, rubber valves with brass seats, guards and springs, suitable for pumping hot or cold water.

Metal valves, with special seats and guards, furnished to suit any requirement. In comparing capacities it should be borne in mind that the Snow Pump has *two* plungers and is therefore double the capacity of a single plunger pump of the same dimensions.

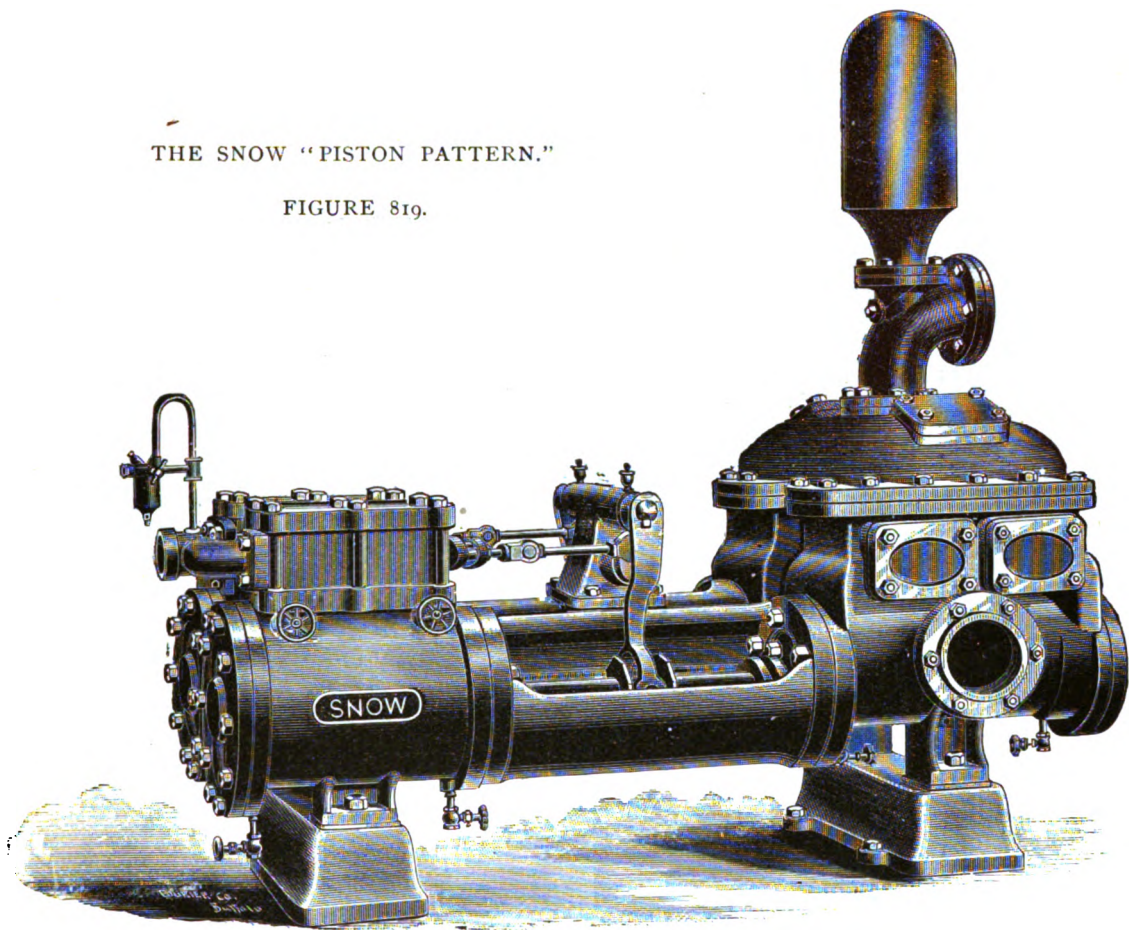
Diameter of Steam Cylinders.	Diameter of Water Plungers.	Length of Stroke.	Displacement in Gallons per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with kind of work and pressure.	Gallons delivered per minute by BOTH Plungers at stated number of Strokes.	Diameter of Pipes in Inches.				Diameter of Plunger required in single cylinder pump for same work.	
						Steam.	Exhaust.	Suction.	Discharge.		
Fig. 818 A. Fig. 818 B.	2½	1½	2	.015	150 to 300	4½ to 9	¾	¾	1	¾	2½
	3	2	3	.041	100 " 250	8 " 20	¾	¾	1¼	1	2½
	4½	2¾	4	.10	100 " 200	20 " 40	½	1	2	1½	4
	5½	3½	5	.21	100 " 200	40 " 80	¾	1¼	2½	2	5
	6	4	6	.33	100 " 150	66 " 100	1	1½	3	2	5½
	7	4½	8	.55	100 " 150	110 " 165	1¼	2	4	3	6½
	8	5	10	.85	75 " 125	137 " 212	1½	2	5	4	7½
	8	6	10	1.22	75 " 125	170 " 305	1½	2	5	4	8½
	10	6	10	1.22	75 " 125	180 " 305	2	2½	5	4	8½
	10	7	10	1.66	75 " 125	250 " 415	2	2½	6	5	9½
	12	7	12	2.00	75 " 125	300 " 500	2½	3	6	5	9½
	14	7	12	2.00	75 " 125	300 " 500	2½	3	6	5	9½
12	8½	12	2.95	75 " 125	440 " 740	2½	3	8	5	12	
14	8½	12	2.95	75 " 125	440 " 740	2½	3	8	5	12	
16	8½	12	2.95	75 " 125	440 " 740	2½	3	8	5	12	
18	8½	12	2.95	75 " 125	440 " 740	3	4	8	5	12	
20	8½	12	2.95	75 " 125	440 " 740	4	5	8	5	12	
12	10	12	4.1	75 " 125	612 " 1020	2½	3	8	7	14½	
14	10	12	4.1	75 " 125	612 " 1020	2½	3	8	7	14½	
16	10	12	4.1	75 " 125	612 " 1020	2½	3	8	7	14½	
18	10	12	4.1	75 " 125	612 " 1020	3	4	8	7	14½	
20	10	12	4.1	75 " 125	612 " 1020	4	5	8	7	14½	
14	12	12	5.90	75 " 125	885 " 1480	2½	3	10	8	17	
16	12	12	5.90	75 " 125	885 " 1480	2½	3	10	8	17	
18	12	12	5.90	75 " 125	885 " 1480	3	4	10	8	17	
20	12	12	5.90	75 " 125	885 " 1480	4	5	10	8	17	
18	14	12	8.00	75 " 125	1200 " 2000	3	4	12	10	19½	
20	14	12	8.00	75 " 125	1200 " 2000	4	5	12	10	19½	

When pumps are fitted with brass plungers and piston rods a slight additional charge is made. An extra charge is made for bed-plates.

STEAM PUMP.

THE SNOW "PISTON PATTERN."

FIGURE 819.



This pump differs from the plunger and ring form as the water piston is packed with flax and rubber. This packing being elastic makes a perfectly tight piston.

These pumps may be provided with a movable lining at a slight extra cost. The combination of a readily renewed packing with a movable lining secures the greatest service and durability.

Both the suction and delivery valves in this design are placed above the piston. These pumps are recommended for pressures up to 250 pounds per square inch.

This pump, slightly modified, is extensively used in breweries to deliver beer or mash, hot or cold. The valves are constructed for the service, and never clog. Packed pistons, composition lined cylinders, brass valve seats and rubber valves.

A pump possessing smooth action is required in this service, where the delivery is into copper pipes and pans. The Snow Pump delivers with perfect smoothness. The destructive pounding and concussion of the single cylinder pump which soon cause copper pipes and pans to leak, are avoided.

Diameter of Steam Cylinders.	Diameter of Water Pistons.	Length of Stroke.	Gallons delivered per minute at proper speed under ordinary conditions.	Single Cylinder Pumps would require following diameter.	Diameter of Pipes in Inches.			
					Steam.	Exhaust.	Suction.	Dis-charge.
4½	3¾	4	38 to 76	5¼	½	1	2½	2
5¼	3¾	5	40 " 80	5	¾	1¼	2½	2
5¼	4¾	5	75 " 150	6¾	¾	1¼	3	2½
6	4	6	66 " 100	5½	1	1½	3	2
6	5¾	6	134 " 200	8½	1	1½	4	3
8	6	10	185 " 308	8½	1½	2	5	4
10	6	10	185 " 308	8½	2	2½	5	4
8	7	10	245 " 410	9½	1½	2	6	5
10	7	10	245 " 410	9½	2	2½	6	5
8	8½	10	365 " 610	12	1½	2	8	5
10	8½	10	365 " 610	12	2	2½	8	5
8	10	10	510 " 850	14½	1½	2	8	7
10	10	10	510 " 850	14½	2	2½	8	7
12	10	12	612 " 1020	14½	2½	3	8	7
14	10	12	612 " 1020	14½	2½	3	8	7
12	12	12	882 " 1466	17	2½	3	10	8
14	14	12	1196 " 1995	19¾	2½	3	12	10

When pumps are fitted with brass pistons and piston rods a slight additional charge is made.

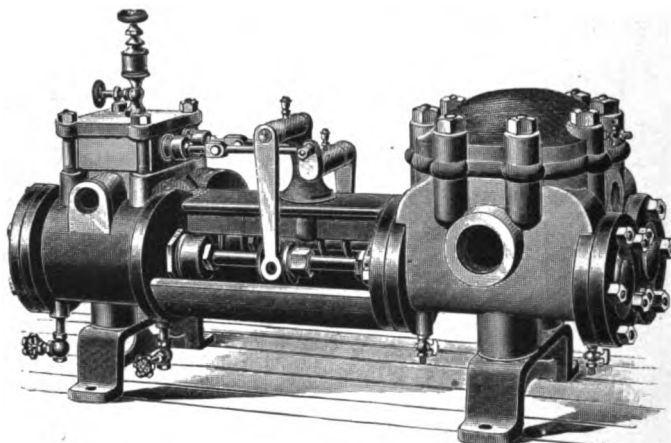
STEAM PUMP.

THE SNOW PISTON PRESSURE.

SPECIALLY ADAPTED FOR SHORT OIL LINES OR OTHER PURPOSES

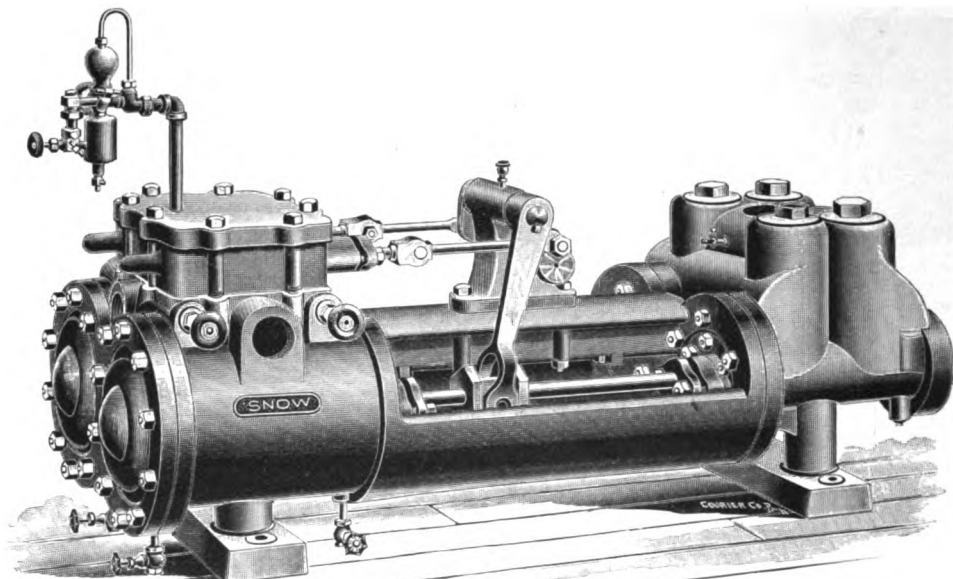
REQUIRING MEDIUM PRESSURES.

SMALL SIZE.—FIGURE 820.



6 x 3 x 6 will pump against 350 lbs. pressure with 80 lbs. steam.
 7 x 3 x 8 " " " 450 " " " 80 " "

LARGE SIZE.—FIGURE 820 A



10 x 3½ x 10 will pump against 1000 lbs. pressure with 80 lbs. steam.

THE SNOW "PISTON PRESSURE" PUMP.

This pump is designed to pump liquids against pressures, ranging from 300 to 1000 lbs. per square inch.

It differs from the regular "Pressure" Pump, in that it has brass pistons, packed with fibrous packing, instead of plungers.

These pumps are used extensively on Oil Lines, and are especially adapted for pumping heavy oil.

Diameter of Steam Cylinders.	Diameter of Pump Pistons.	Length of Stroke.	Displacement per Stroke of ONE Piston.	Proper Strokes per minute of ONE Piston.	Delivery per minute by BOTH Pistons at Stated number of Strokes.	Diameter of Pipes in inches.			
						Steam.	Exhaust.	Suction.	Discharge.
Inches.	Inches.	Inches.	Gallons.		Gallons.				
6	3	6	.19	100-150	38-57	1	1½	2½	2
7	3	8	.25	100-150	50-75	1½	2	2½	2
6	3½	6	.25	100-150	50-75	1	1½	3	2
8	3½	10	.42	75-125	63-105	1½	2	3	2
10	3½	10	.42	75-125	63-105	2	2½	3	2
8	4½	10	.69	75-125	103-173	1½	2	4	3
10	4½	10	.69	75-125	103-173	2	2½	4	3

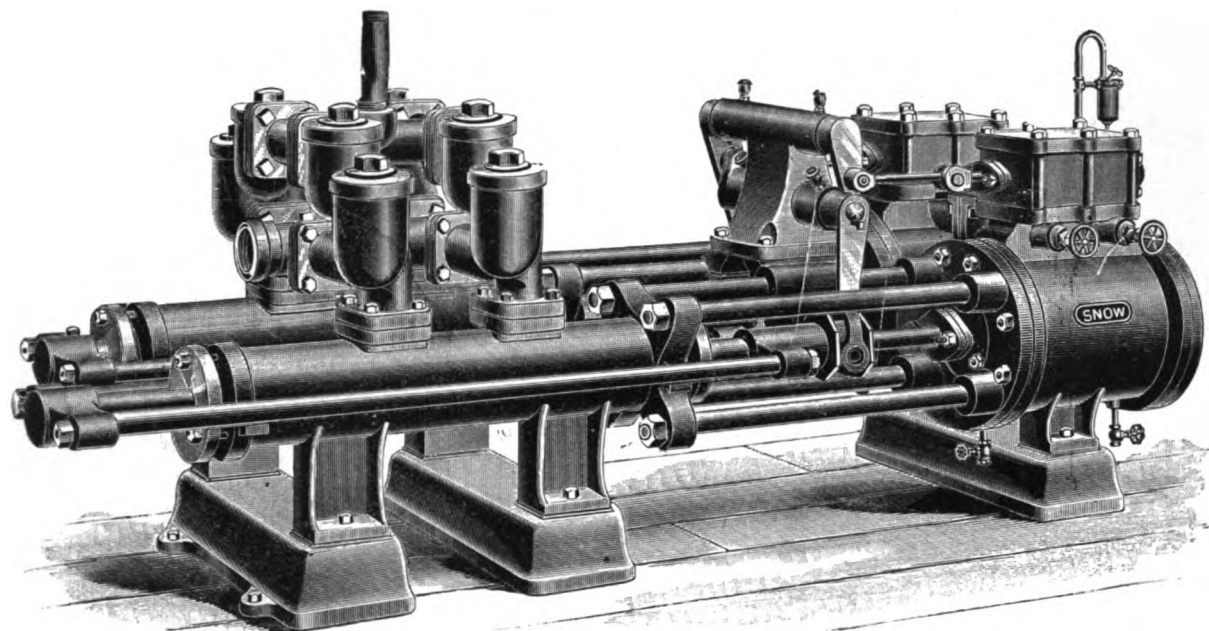
When pumps are fitted with brass piston rods a slight additional charge is made.

Sizes are designated by the diameter of the steam cylinders, the diameter of the pump pistons and the length of stroke.

STEAM PUMP.

THE SNOW "HEAVY PRESSURE."

FIGURE 821.



This pump sustains the severe service incident to heavy pressure. Two long plungers, single acting, work in each end of a cylinder with a central partition. The plungers are connected by exterior rods, making the pump double acting. The exterior stuffing boxes give easy access in case of leakage and allow the use of different kinds of packing. These pumps are used on Oil Lines, by Hydraulic Presses and for mining purposes.

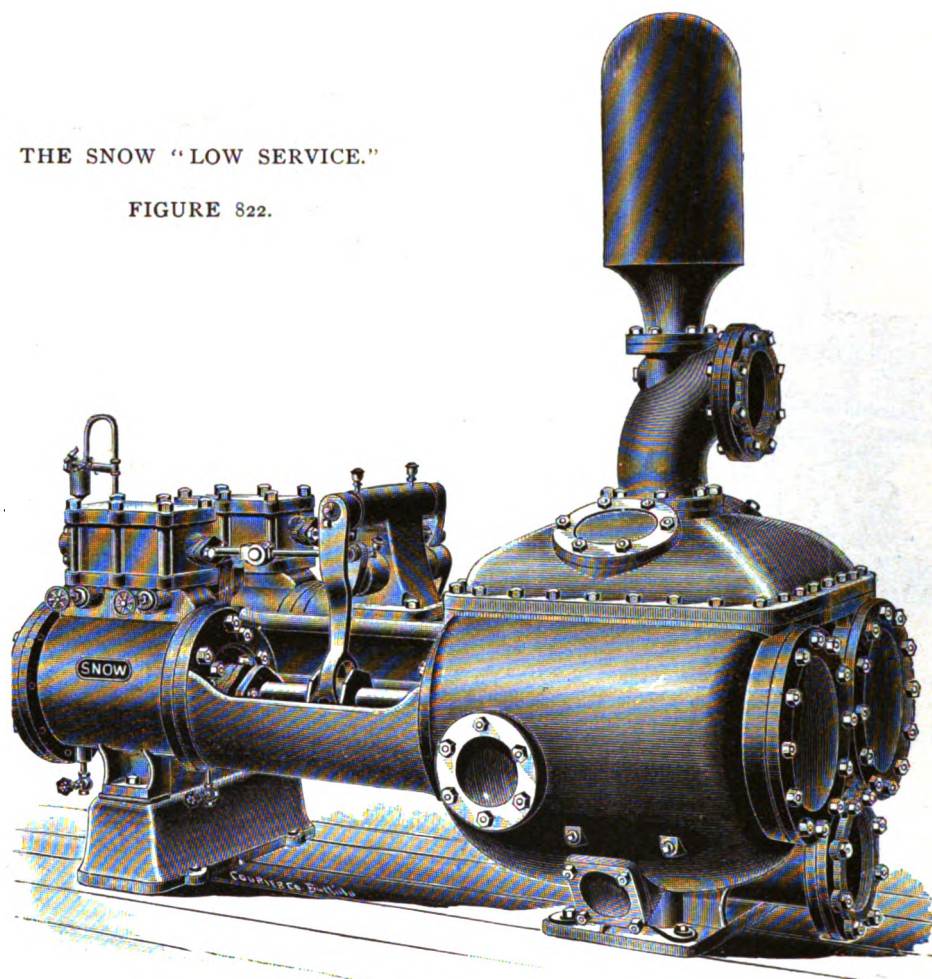
Diameter of Steam Cylinder.	Diameter of Water Plungers.	Length of Stroke.	Displacement in Gallons per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with kind of work and pressure.	Gallons delivered per minute by BOTH Plungers at stated number of Strokes.	Diameter of Pipes in Inches.			
						Steam.	Exhaust.	Suction.	Dis-charge.
4½	1	4	.013	40 to 110	1 to 3	¾	1	¾	¾
4½	2	4	.05	40 " 110	4 " 11	¾	1	1¼	1
6	2	8	.10	35 " 90	7 " 18	1	1½	1½	1
6	2½	8	.17	35 " 90	12 " 30	1	1½	2	1½
6	3	8	.25	35 " 90	13 " 38	1	1½	2½	2
7	2	8	.10	35 " 90	7 " 18	1¼	2	2	1½
7	2½	8	.17	35 " 90	12 " 30	1¼	2	2	1½
7	3	8	.25	25 " 75	13 " 38	1¼	2	2½	2
8	2½	10	.21	25 " 75	11 " 33	1½	2	2	1½
8	3	10	.31	25 " 75	16 " 47	1½	2	2½	2
8	3½	10	.42	25 " 75	21 " 63	1½	2	2½	2
10	2	10	.14	25 " 75	7 " 21	2	2½	2	1½
10	3	10	.31	25 " 75	16 " 47	2	2½	2½	2
10	4	10	.54	25 " 75	27 " 81	2	2½	3	2
10	5	10	.85	25 " 75	42 " 126	2	2½	4	3
12	3	12	.37	25 " 75	18 " 54	2½	3	2½	2
12	4	12	.65	25 " 75	33 " 97	2½	3	3	2
12	5	12	1.02	25 " 75	51 " 153	2½	3	4	3
12	7	12	2.00	25 " 75	100 " 297	2½	3	5	4
14	3	12	.37	25 " 75	18 " 54	2½	3	2½	2
14	4	12	.65	25 " 75	33 " 97	2½	3	3	2
14	5	12	1.02	25 " 75	51 " 153	2½	3	4	3
14	7	12	2.00	25 " 75	100 " 297	2½	3	5	4
16	3	12	.37	15 " 65	11 " 48	2½	3	2½	2
16	4	12	.65	15 " 65	19 " 85	2½	3	3	2
16	5	12	1.02	15 " 65	30 " 132	2½	3	4	3
16	7	12	2.00	15 " 65	60 " 260	2½	3	5	4
18	3	12	.37	15 " 65	11 " 48	3	4	2½	2
18	4	12	.65	15 " 65	19 " 85	3	4	3	2
18	5	12	1.02	15 " 65	30 " 132	3	4	4	3
18	7	12	2.00	15 " 65	60 " 260	3	4	5	4
20	3	12	.37	15 " 65	11 " 48	4	5	2½	2
20	4	12	.65	15 " 65	19 " 85	4	5	3	2
20	5	12	1.02	15 " 65	30 " 132	4	5	4	3
20	7	12	2.00	15 " 65	60 " 260	4	5	5	4
20	8	12	2.61	15 " 65	80 " 340	4	5	6	5

Bed-plates extra. When pumps are fitted with brass plungers a slight additional charge is made.

STEAM PUMP.

THE SNOW "LOW SERVICE."

FIGURE 822.



In this form the steam pistons and water plungers are of nearly the same diameter. With low lifts a saving in steam results. It is intended for Railway Water Supply Stations, Tanneries, Breweries, Oil Tanks, Refineries, etc.

This form has water plungers, but pistons will be substituted when desired.

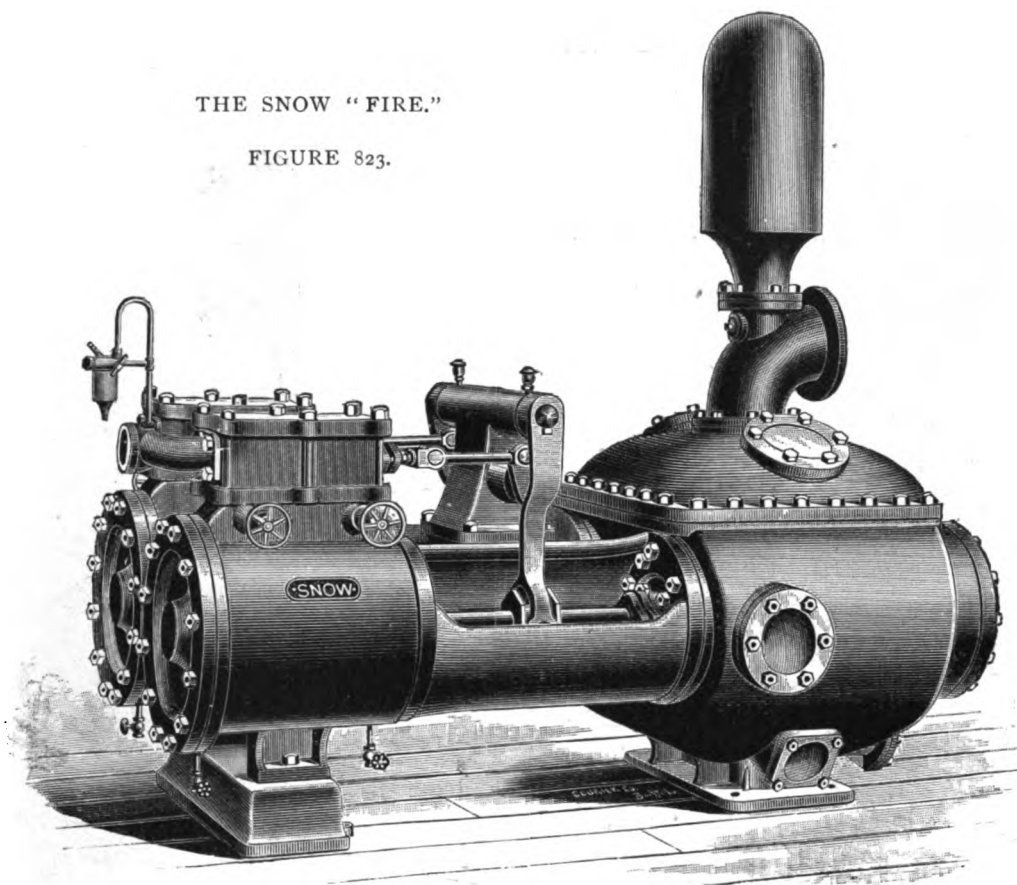
Diameter of Steam Cylinders.	Diameter of Water Plungers.	Length of Stroke.	Displacement per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with kind of work and pressure.	Delivery per minute by BOTH Plungers at stated number of Strokes.	Diameter of Plunger in single pump to do the same work.	Diameter of Pipe in Inches.			
							Steam.	Exhaust.	Suction.	Discharges.
Inches.	Inches.	Inches.	Gallons.		Gallons.					
4½	3¾	4	.19	100 to 200	38 to 76	5¼	1½	1	2½	2
5¼	4¾	5	.38	100 " 200	75 " 150	6¾	¾	1¼	3	2½
6	5¾	6	.67	100 " 150	134 " 200	8½	1	1½	4	3
7	6¾	8	1.23	100 " 150	245 " 370	9½	1¼	2	5	4
8	6	10	1.22	75 " 125	185 " 308	8½	1½	2	5	4
8	7	10	1.66	75 " 125	250 " 410	9¾	1½	2	6	5
8	8½	10	2.45	75 " 125	365 " 610	12	1½	2	8	5
10	8½	10	2.45	75 " 125	365 " 610	12	2	2½	8	5
10	10	10	3.40	75 " 125	510 " 850	14½	2	2½	8	7
12	10	12	4.10	75 " 125	612 " 1020	14½	2½	3	8	7
8	12	10	4.90	75 " 125	730 " 1220	17	1½	2	10	8
10	12	10	4.90	75 " 125	730 " 1220	17	2	2½	10	8
12	12	12	5.90	75 " 125	885 " 1480	17	2½	3	10	8
10	14	10	6.65	75 " 125	1000 " 1660	19¾	2	2½	12	10
12	14	12	8.00	75 " 125	1200 " 2000	19¾	2½	3	12	10
14	14	12	8.00	75 " 125	1200 " 2000	19¾	2½	3	12	10
16	14	12	8.00	75 " 125	1200 " 2000	19¾	2½	3	12	10

Sizes are designated by the diameter of steam cylinders, the diameter of the water plungers, and the length of stroke, Brass plungers and piston rods are extra. An extra charge for Bed-plates.

STEAM PUMP.

THE SNOW "FIRE."

FIGURE 823.



It is in the emergencies a fire pump meets that the Snow valve motion shows its superiority.

Each valve being controlled by its opposite steam piston, it is impossible for the pump to be on "dead center" and the full power of the steam piston being transferred to the valve rod there can be no sticking of the valve. A fire pump remains unused for months, and a pump that depends upon throwing its valve by tappet motion is unreliable.

The valve and water passages are unusually large, ensuring the complete filling of the pump cylinders even when the pump is at its greatest speed.

Valves connect the clearance at each end of the steam cylinders with the exhaust; this permits of either diminishing or increasing the space between the head and the piston. As the clearance spaces are reduced to a minimum at the various speeds, a saving in steam results, and the pump may be run at a much higher rate of speed.

It is of great advantage to have the compound arrangement of steam cylinders, (as shown on page 278,) resulting in a saving of from 20 to 30 per cent. in fuel. Snow Fire Pumps may be fitted with water pistons, instead of plungers, or the "Piston Pattern" shown on page 273, may be used.

THE SNOW "UNDERWRITER FIRE" PUMP.

The Associated Factory Mutual Insurance Company has drawn specifications for the construction of the "Underwriter Fire Pump."

We furnish pumps according to these specifications. The cost is greater than the ordinary form but a decrease in premiums more than covers the extra cost.

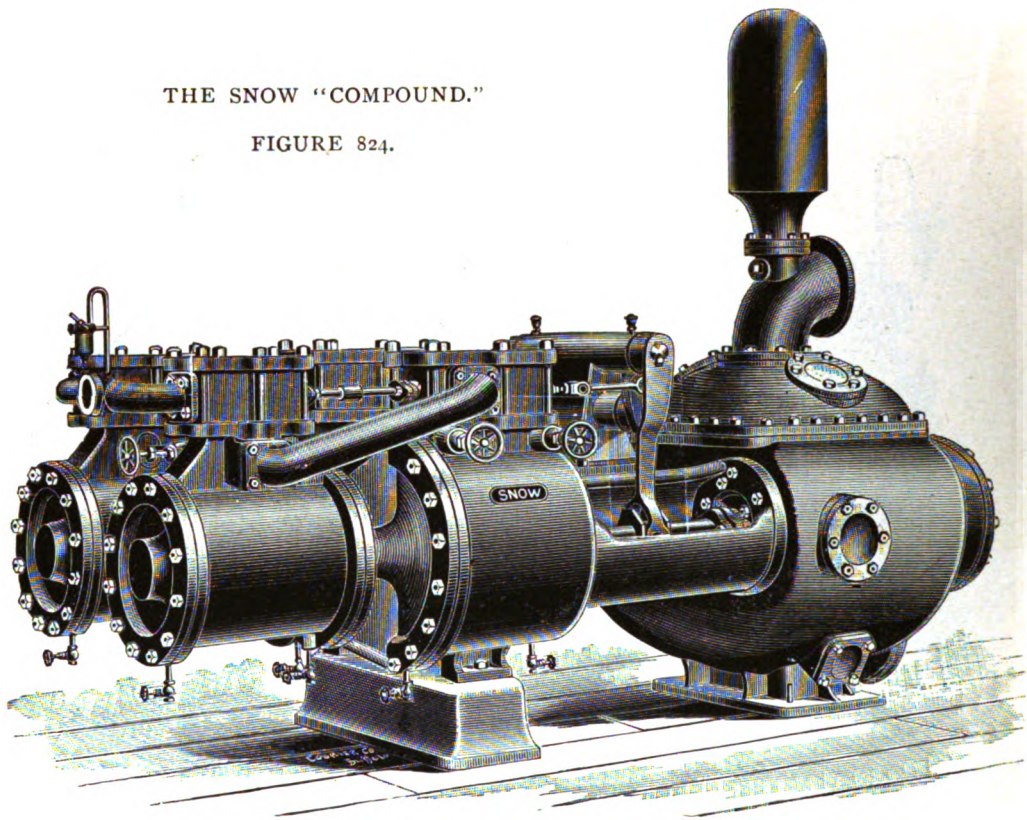
Diameter of Steam Cylinders.	Diameter of Water Plungers.	Length of Stroke.	Displacement per Stroke of ONE Plunger.	Proper Stroke per minute of ONE Plunger, varying with work.	Delivery per minute by both Plungers at stated number of Strokes.	Diameter of Plunger in single cylinder to do the same work.	Diameter of Pipes in Inches.			
							Steam.	Exhaust.	Suction.	Discharge.
Inches.	Inches.	Inches.	Gallons.		Gallons.					
7	3½	8	.33	100 to 150	66 to 99	5	1¼	2	4	3
8	4	10	.54	100 " 150	110 " 165	5½	1½	2	5	4
10	4½	10	.69	100 " 150	140 " 210	6¾	2	2½	5	4
10	5	10	.85	100 " 150	170 " 250	7½	2	2½	5	4
12	5	12	1.02	100 " 150	204 " 306	7½	2½	3	6	5
14	6	12	1.46	100 " 150	284 " 420	8½	2½	3	6	5
14	7	12	2.00	100 " 150	400 " 600	9½	2½	3	6	6
16	7	12	2.00	100 " 150	400 " 600	9½	2½	3	6	6
16	8	12	2.60	100 " 150	522 " 783	11¼	2½	3	8	6
18	8½	12	2.95	100 " 150	590 " 885	12	3	4	8	6
18	9	12	3.30	100 " 150	660 " 990	12¾	3	4	8	7
20	9	12	3.30	100 " 150	660 " 990	12¾	4	5	8	7
20	10	12	4.10	100 " 150	816 " 1224	14½	4	5	8	7

Brass plungers and piston rods an additional charge. An extra charge for Bed-plates.

STEAM PUMP.

THE SNOW "COMPOUND."

FIGURE 824.



Where a saving in fuel is desired this combination of high and low pressure cylinders is recommended. The steam acting through the entire stroke upon the smaller piston expands upon the larger during the return stroke. This is in effect the same as using a cut-off device and results in a saving of from 20 to 30 per cent. As compound cylinders requires less steam, the size and cost of boilers may be materially lessened.

Compound cylinders are used extensively on Hydraulic Elevator Pumps, Fire, Pressure and Mine Pumps; also on pumps designed for the water supply of small Cities and Towns.

If desired, steam may be led directly to the low pressure cylinder.

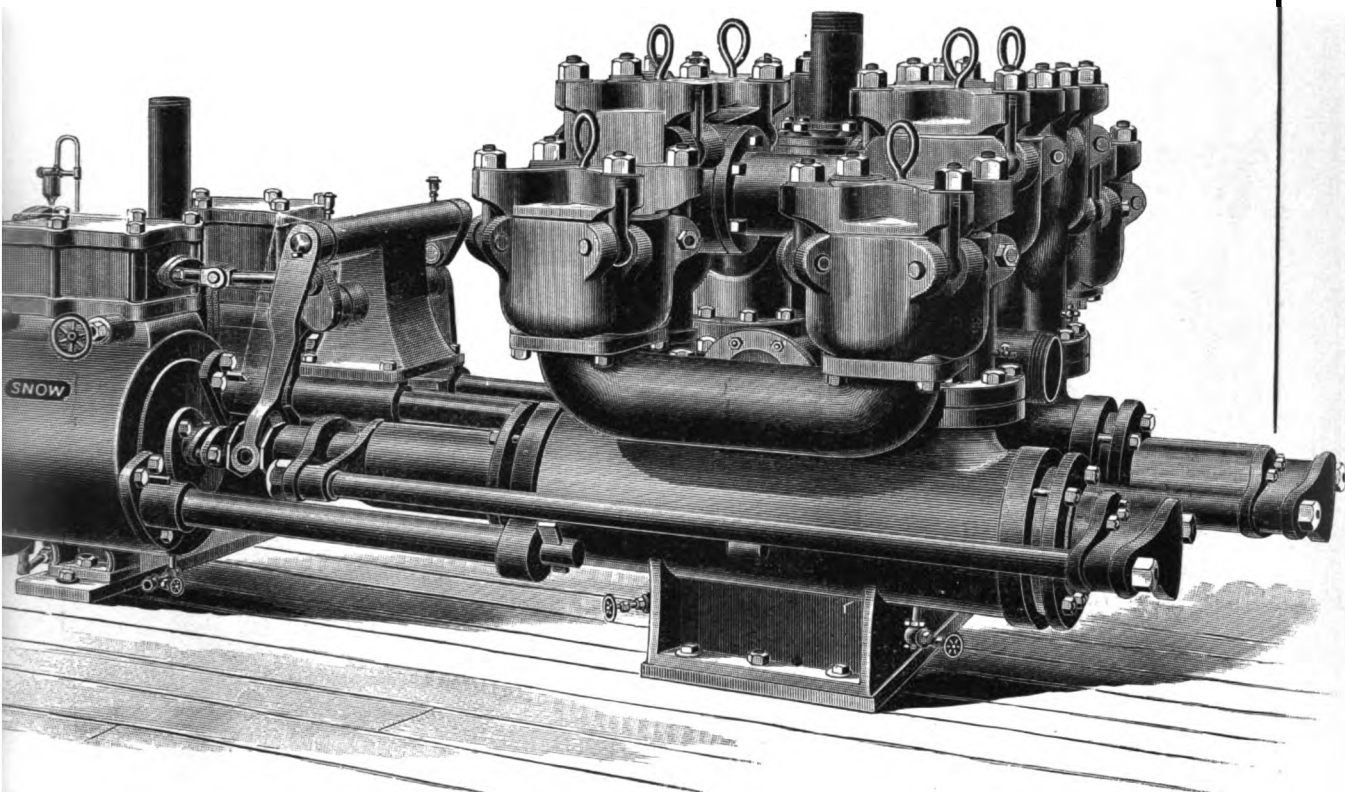
Diameter of Steam Cylinder.	Diameter of Water Plungers.	Length of Stroke.	Displacement per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with work.	Delivery per minute by BOTH Plungers at stated number of Strokes.	Diameter of Plunger in single cylinder to do the same work.	Diameter of Pipes in Inches.			
							Steam.	Exhaust.	Suction.	Discharge.
Inches.	Inches.	Inches.	Gallons.		Gallons.					
8 and 12	7	12	2.00	75 to 125	292 to 492	9 3/4	1 1/2	3	6	5
8 " 12	8 1/2	12	2.95	75 " 125	440 " 740	12	1 1/2	3	6	5
10 " 16	8 1/2	12	2.95	75 " 125	440 " 740	12	2	3	6	5
12 " 18	8 1/2	12	2.95	75 " 125	440 " 740	12	2 1/2	4	6	5
14 " 20	8 1/2	12	2.95	75 " 125	440 " 740	12	2 1/2	5	6	5
8 " 12	10	12	4.10	75 " 125	612 " 1020	14 1/8	1 1/8	3	8	7
10 " 16	10	12	4.10	75 " 125	612 " 1020	14 1/8	2	3	8	7
12 " 18	10	12	4.10	75 " 125	612 " 1020	14 1/8	2 1/2	4	8	7
14 " 20	10	12	4.10	75 " 125	612 " 1020	14 1/8	2 1/2	5	8	7
8 " 12	12	12	5.90	75 " 125	885 " 1480	17	1 1/2	3	10	8
10 " 16	12	12	5.90	75 " 125	885 " 1480	17	2	3	10	8
12 " 18	12	12	5.90	75 " 125	885 " 1480	17	2 1/2	4	10	8
14 " 20	12	12	5.90	75 " 115	884 " 1480	17	2 1/2	5	10	8
10 " 16	14	12	8.00	75 " 115	1200 " 2000	19 3/4	2	3	12	10
12 " 18	14	12	8.00	75 " 115	1200 " 2000	19 3/4	2 1/2	4	12	10
14 " 20	14	12	8.00	75 " 115	1200 " 2000	19 3/4	2 1/2	5	12	10

Brass plungers and piston rods extra. An extra charge for Bed-plates.

STEAM PUMP.

THE SNOW "MINE."

FIGURE 825.



For mines the plunger form of pump is recommended, especially where the water is gritty or sulphurous.

The water valves are in small chambers, readily accessible and capable of standing very heavy pressures.

These pumps are designed for a high working pressure, and all parts are made strong to meet rough usage. When the water is strongly acid, the plunger, stuffing boxes and valves may be made of composition metal. In extreme cases the entire water end may be cast of the same material.

Exterior stuffing boxes are used in this pattern, with the great advantage of being in sight so that any leak may be at once detected.

Diameter of Steam Cylinder.	Diameter of Water Plungers.	Length of Stroke.	Displacement per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with work.	Delivery per minute by BOTH Plungers at stated number of Strokes.	Diameter of Pipes in Inches.			
						Steam.	Exhaust.	Suction.	Dis-charge.
Inches.	Inches.	Inches.	Gallons.		Gallons.				
10	2	10	.14	25 to 75	7 to 21	2	2½	2	1½
10	3	10	.31	25 " 75	16 " 47	2	2½	2½	2
10	4	10	.54	25 " 75	27 " 81	2	2½	3	2
10	5	10	.85	25 " 75	42 " 126	2	2½	4	3
12	3	12	.37	25 " 75	18 " 54	2½	3	2½	2
12	4	12	.65	25 " 75	33 " 97	2½	3	3	2
12	5	12	1.02	25 " 75	51 " 153	2½	3	4	3
12	7	12	2.00	25 " 75	100 " 297	2½	3	5	4
14	3	12	.37	25 " 75	18 " 54	2½	3	2½	2
14	4	12	.65	25 " 75	33 " 97	2½	3	3	2
14	5	12	1.02	25 " 75	51 " 153	2½	3	4	3
14	7	12	2.00	25 " 75	100 " 297	2½	3	5	4
16	3	12	.37	15 " 65	11 " 48	2½	3	2½	2
16	4	12	.65	15 " 65	19 " 85	2½	3	3	2
16	5	12	1.02	15 " 65	30 " 132	2½	3	4	3
16	7	12	2.00	15 " 65	60 " 260	2½	3	5	4
18	3	12	.37	15 " 65	11 " 48	3	4	2½	2
18	4	12	.65	15 " 65	19 " 85	3	4	3	2
18	5	12	1.02	15 " 65	30 " 132	3	4	4	3
18	7	12	2.00	15 " 65	60 " 260	3	4	5	4
20	3	12	.37	15 " 65	11 " 48	4	5	2½	2
20	4	12	.65	15 " 65	19 " 85	4	5	3	2
20	5	12	1.02	15 " 65	30 " 132	4	5	4	3
20	7	12	2.00	15 " 65	60 " 260	4	5	5	4
20	8	12	2.61	15 " 65	80 " 340	4	5	6	5

When pumps are fitted with brass plungers and piston rods a slight additional charge is made. An extra charge is made for Bed-plates.

STEAM PUMPS.

THE SNOW "DUPLEX ON DRIP PAN,"
AND STAND.

FIGURE 826.

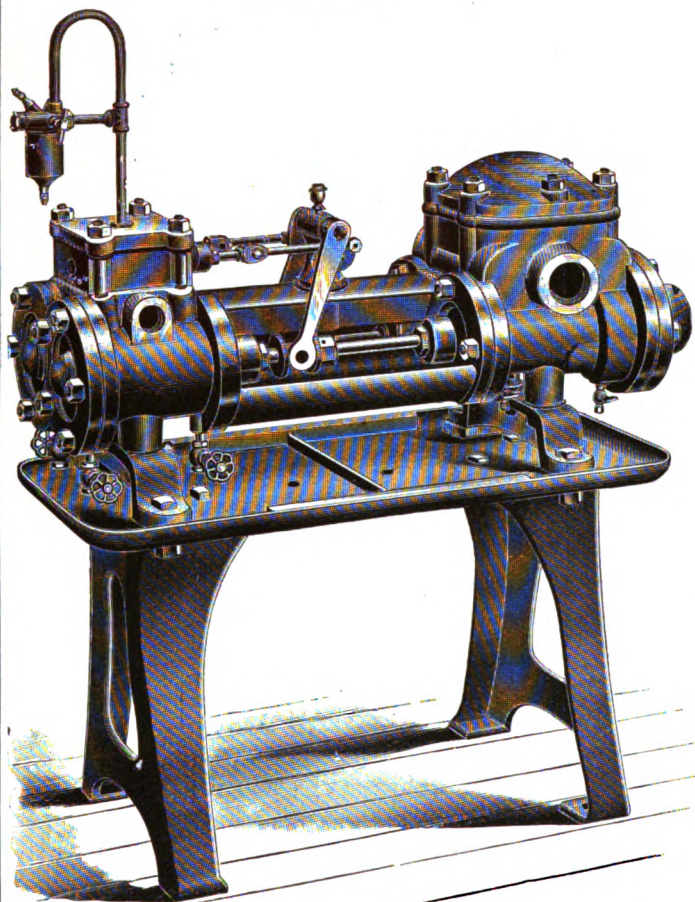
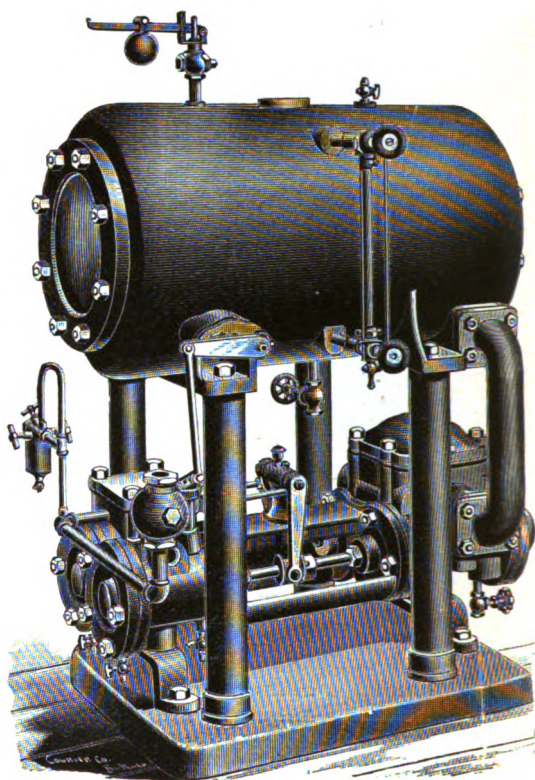
THE SNOW "AUTOMATIC FEED
PUMP AND RECEIVER."

FIGURE 827.



This Pump is mounted on a cast iron drip pan and stand. The cleanliness resulting from having the drip pan in combination with the stand will be appreciated by all.

By means of a drain the drip pan may be emptied.

Diameter of Steam Cylinders.	Diameter of Water Plunger.	Length of Stroke.	Displacement per Stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger varying with work.	Delivery per minute by BOTH Plungers at stated number of Strokes.	Diameter of Plunger in single cylinder to do the same work.	Diameter of Pipes in Inches.			
							Steam.	Exhaust.	Suction.	Discharge.
Inches.	Inches.	Inches.	Gallons.		Gallons.					
3	2	3	.04	100 to 250	8 to 20	2 7/8	3/8	1/2	1 1/4	1
4 1/2	2 3/4	4	.10	100 " 200	20 " 40	4	1 1/2	1	2	1 1/2
5 1/4	3 1/2	5	.20	100 " 200	40 " 80	5	3/4	1 1/4	2 1/2	2
6	4	6	.33	100 " 150	70 " 100	5 5/8	1	1 1/2	3	2

When pumps are fitted with brass plungers and piston rods a slight additional charge is made.

AUTOMATIC FEED PUMP AND RECEIVER.

In the draining of steam coil radiators, etc., it is important to have an automatic arrangement, not only for economy, but to avoid the snapping and water-hammer. The delivering of the water of condensation, to the boiler, when in its hottest condition, considerably increases the efficiency of the heating plant.

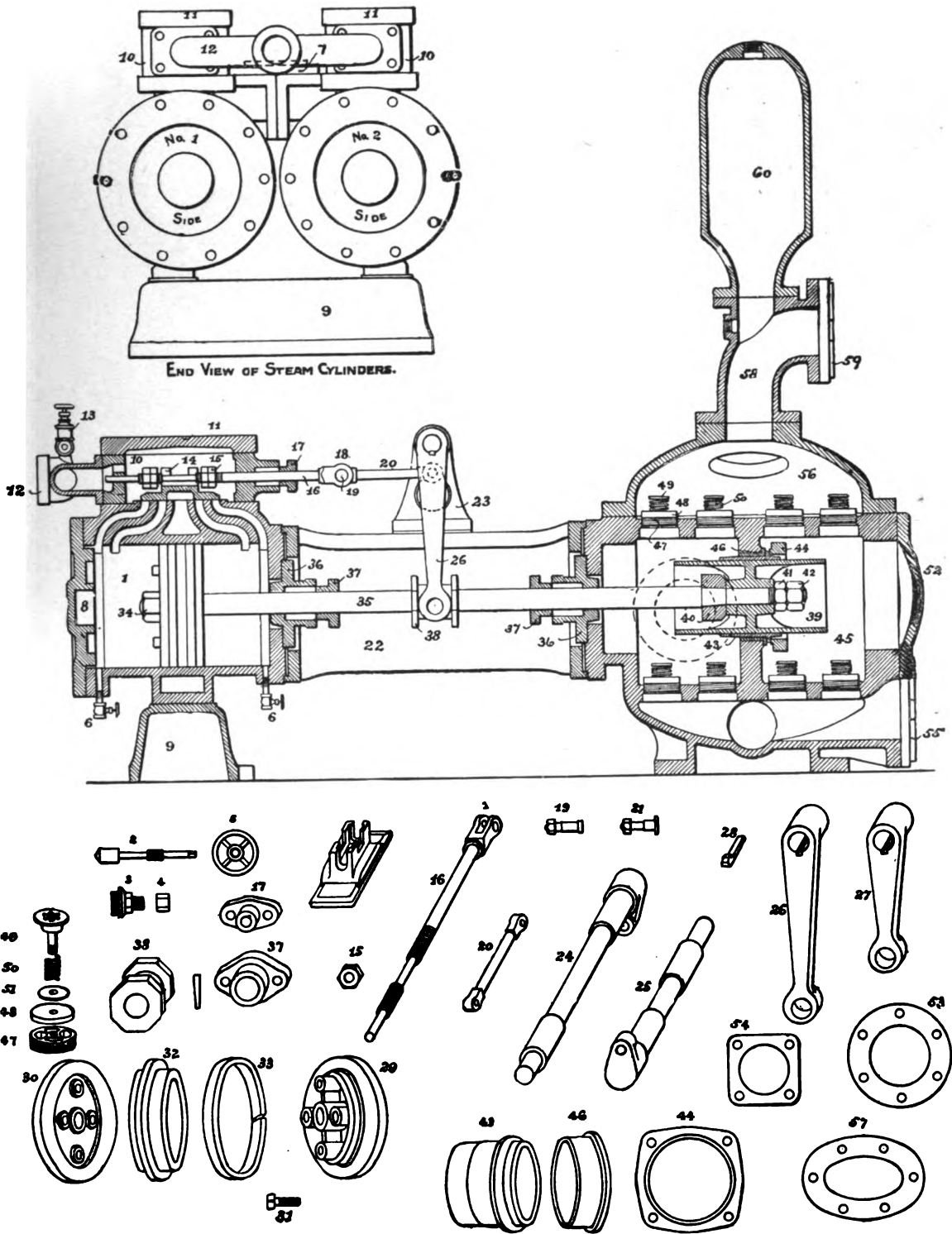
In brief, this apparatus consists of a tank into which the water from the coils, etc., drains. Inside the tank is a ball or float connected with a regulating apparatus on the steam end of the pump. This float regulates the speed of the pump, and the water is kept at about a constant level in the tank.

Size.	Size of Pump.	Gallons delivered per minute.	Sq. feet of Radiating surface it will drain.
A	3 x 2 x 3	12	5,000
B	4 1/2 x 2 3/4 x 4	20	10,000
C	5 1/4 x 3 1/2 x 5	35	20,000
D	6 x 4 x 6	60	40,000

PUMPS.

DETAILS OF
THE SNOW STEAM PUMP.

FIGURE 828.

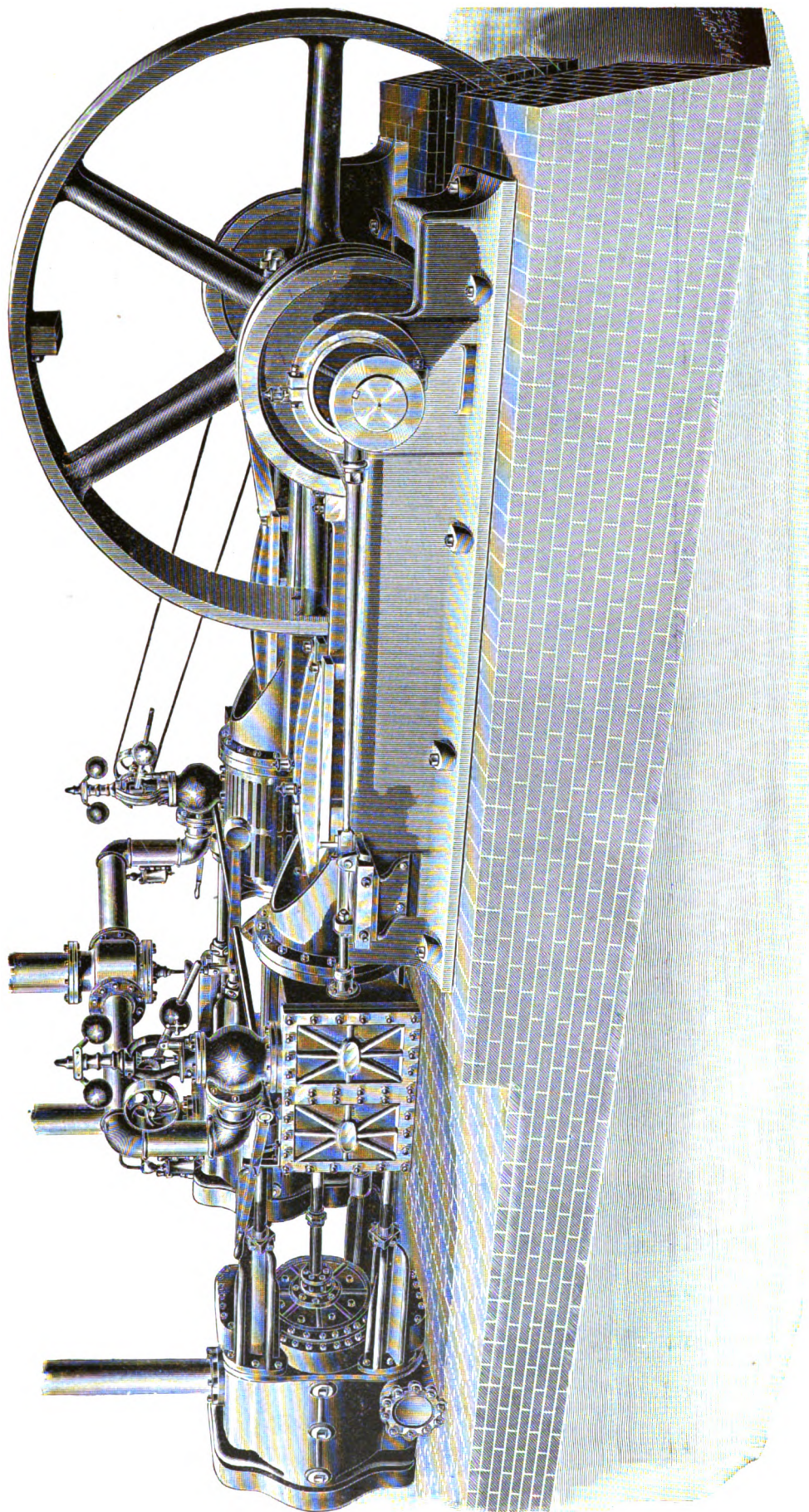


PUMPS.

THE PARTS OF THE SNOW STEAM PUMP.

- | | |
|-------------------------------------|--------------------------------------|
| 1. Steam Cylinder, Nos. 1 and 2. | 31. Steam Piston Follower Bolt. |
| 2. Dash Relief Valve. | 32. Steam Piston Bull Ring. |
| 3. Dash Relief Valve Stuffing Box. | 33. Steam Piston Ring. |
| 4. Dash Relief Valve Gland. | 34. Steam Piston Nut. |
| 5. Dash Relief Valve Hand Wheel. | 35. Piston Rod. |
| 6. Blow Globe Valve. | 36. Piston Rod Stuffing Box. |
| 7. Exhaust Screw Flange. | 37. Piston Rod Gland. |
| 8. Steam Cylinder Head. | 38. Spool and Pin. |
| 9. Steam Cylinder Foot. | 39. Plunger. |
| 10. Steam Chest. | 40. Plunger Collar. |
| 11. Steam Chest Cover. | 41. Plunger Jam Nut. |
| 12. Steam Pipe. | 42. Plunger Nut. |
| 13. Lubricator. | 43. Plunger Ring. |
| 14. Slide Valve. | 44. Binder. |
| 15. Valve Rod Nut. | 45. Water Cylinder. |
| 16. Valve Rod. | 46. Casing. |
| 17. Valve Rod Gland. | 47. Valve Seat. |
| 18. Valve Rod Head. | 48. Valve. |
| 19. Valve Rod Head Pin. | 49. Valve Guard. |
| 20. Valve Rod Link (Long or Short). | 50. Valve Spring. |
| 21. Crank Pin. | 51. Valve Washer. |
| 22. Cradle. | 52. Water Cylinder Head. |
| 23. Cross Stand. | 53. Water Cylinder Hand Hole Plate. |
| 24. Upper Rock Shaft. | 54. Suction Chamber Hand Hole Plate. |
| 25. Lower Rock Shaft. | 55. Suction Screw Flange. |
| 26. Long Valve Motion Lever. | 56. Force Chamber. |
| 27. Short Valve Motion Lever. | 57. Force Chamber Hand Hole Plate. |
| 28. Rock Shaft Key. | 58. Delivery Tee. |
| 29. Steam Piston Body. | 59. Delivery Screw Flange. |
| 30. Steam Piston Follower. | 60. Air Chamber. |

STEAM GAS PUMP.



HALL'S DUPLEX PUMPING ENGINE.

FOR PUMPING NATURAL GAS.

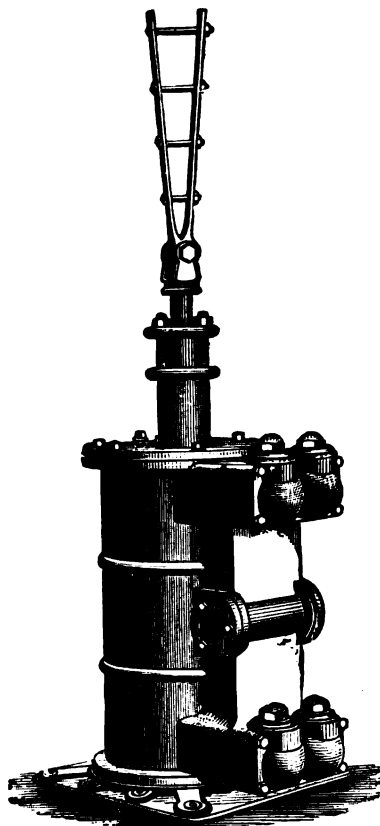
FIGURE 830.

For drawing Natural Gas and forcing it into pipe lines for transportation to long distances, Steam Cylinder 24 inches, Gas Cylinder 24 inches, Stroke 30 inches. Weight about 80,000 pounds. Made to suit the work required.

GAS PUMPS.

TO CONNECT TO WALKING BEAM.

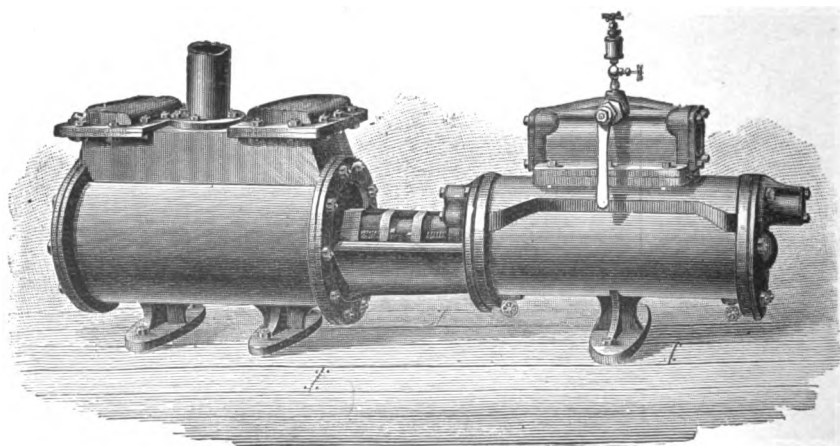
FIGURE 831.



For exhausting gas from wells and forcing it through pipes.

STEAM GAS PUMP.

FIGURE 832.



For same purpose as Figure 831.

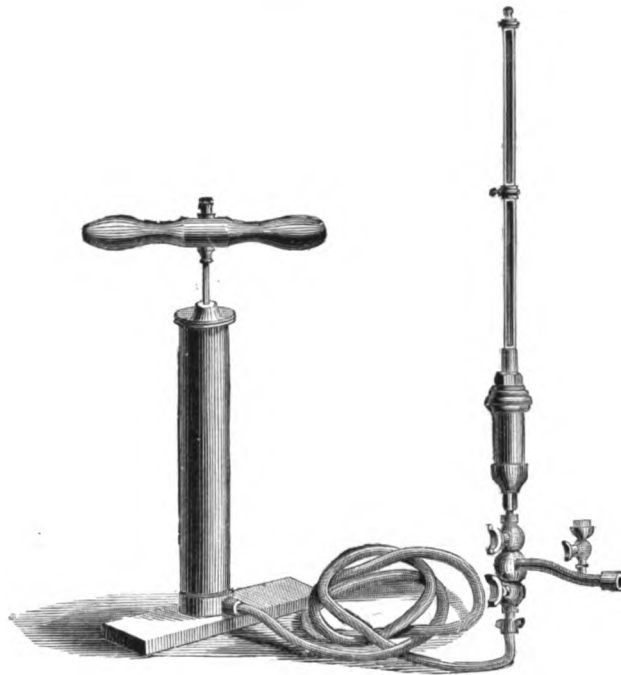
TEST PUMPS.

FOR TESTING GAS PIPES.

PUMP WITH MERCURY COLUMN.

FIGURE 833.

(FORMERLY FIGURE 1125).

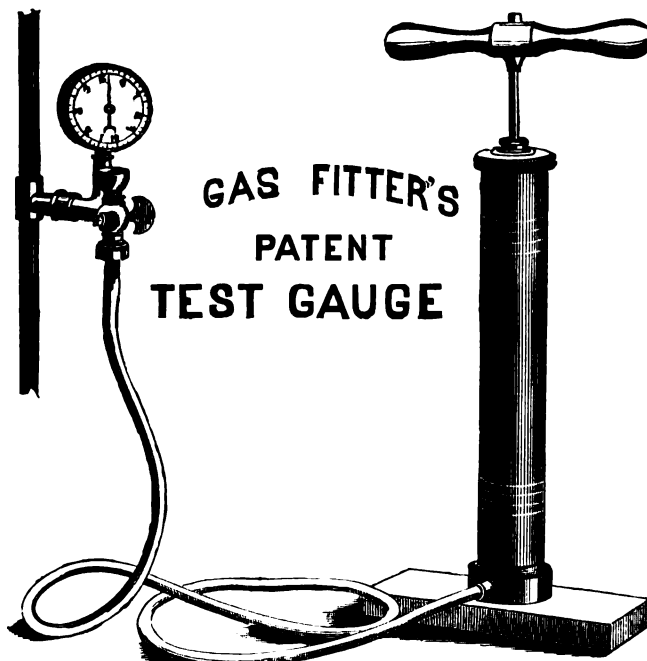


Lutz's Mercury Column, Figure 774 L, is much superior to the form shown here.

PUMP WITH GAUGE AND ETHER CUP.

FIGURE 834.

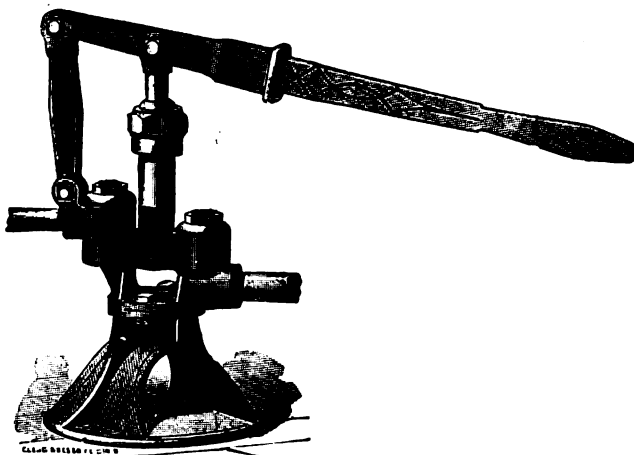
(FORMERLY FIGURE 1126).



TEST PUMPS.

BOILER INSPECTOR'S TEST PUMP.

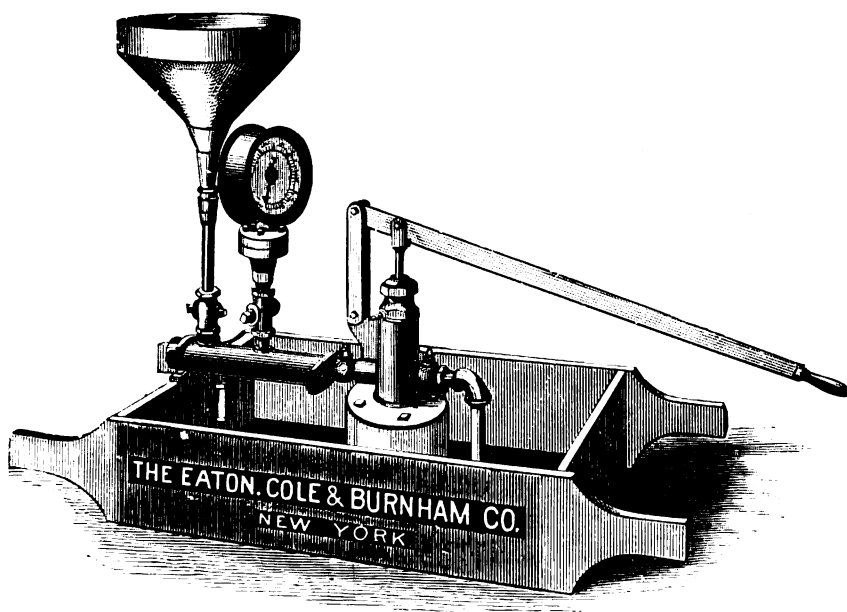
FIGURE 835.



PIPE TESTING PUMP.

FIGURE 836.

(FORMERLY FIGURE 791).



Will test up to 2500 pounds per square inch.

PUMPS.

DRIP PUMP.

FIGURE 837.



For draining water from gas mains.

PLUMBERS' FORCE PUMP.

FIGURE 838.

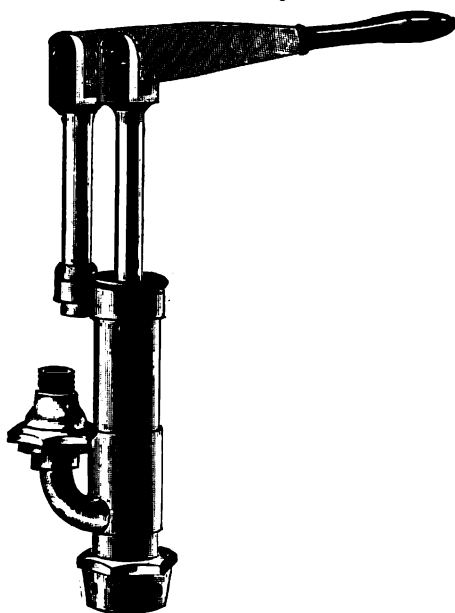
COMPRESSION AND VACUUM PUMP
WITH BRAKE FOR HANDLE.

FIGURE 841

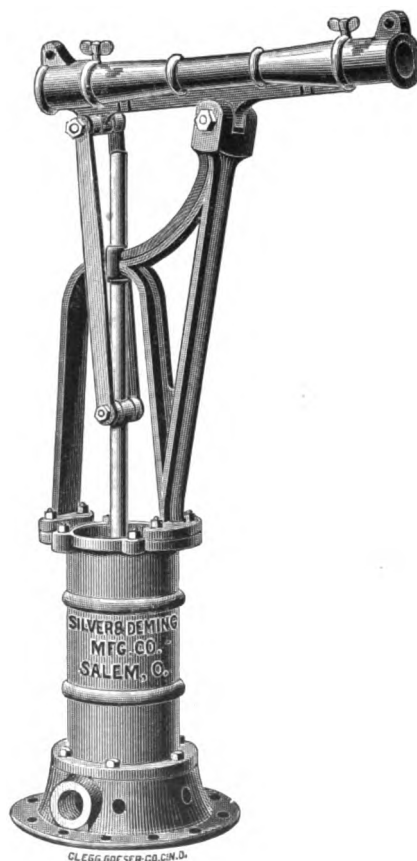
COMPRESSION AND VACUUM PUMP

WITH PITMAN FOR POWER.

FIGURE 840.



CLEGG, ROSE & CO. CHICAGO.



CLEGG, ROSE & CO. CHICAGO.

For Compressing and Exhausting Air.

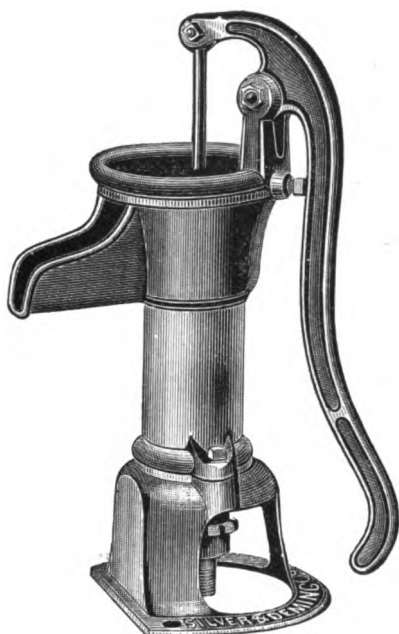
PUMPS.

PITCHER SPOUT PUMPS.

(FORMERLY FIGURE 917).

OPEN TOP.

FIGURE 845.



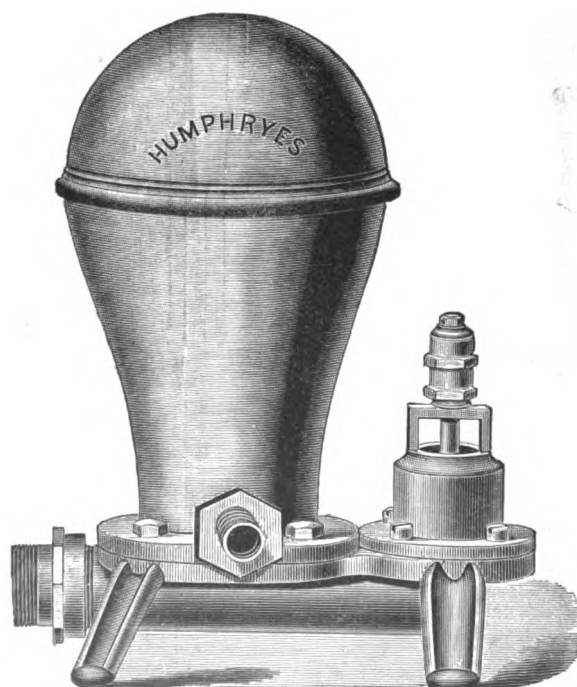
CLOSE TOP.

FIGURE 846.



HYDRAULIC RAM.

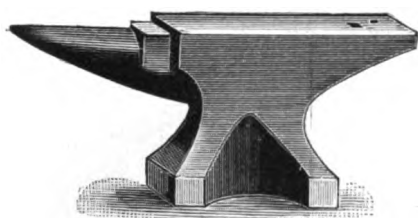
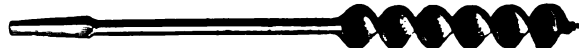
FIGURE 848.



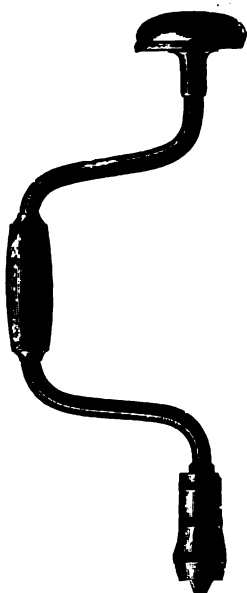
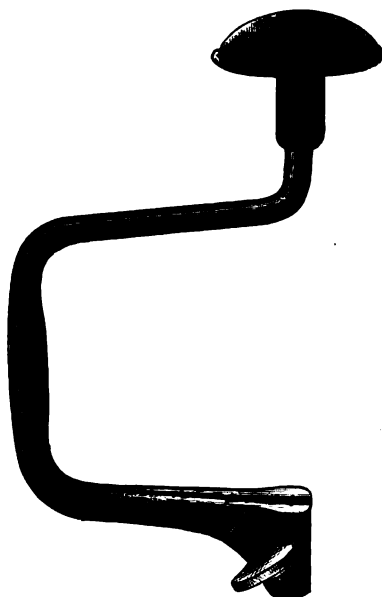
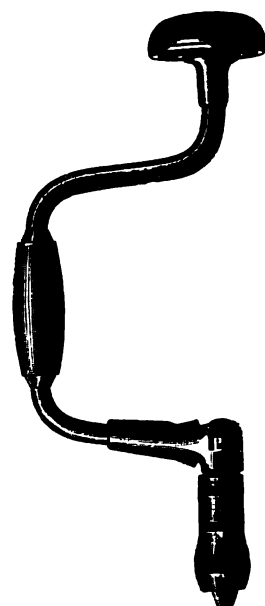
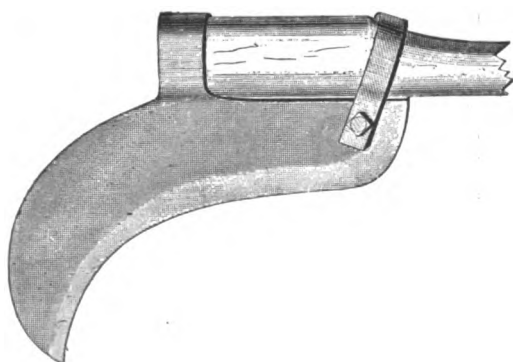
For lifting water.

HARDWARE.**ANVIL.****FIGURE 850.**

(ALSO FIGURE 240).

**AXES.****SINGLE BIT.****FIGURE 851.****DOUBLE BIT.****FIGURE 852.****BROAD AXE.****FIGURE 852 A.****ADZE.****FIGURE 852 B.****AUGER BIT.****FIGURE 853.****AUGER.****FIGURE 854.****CAR AUGER.****FIGURE 855.****SHIP AUGER, WITH SCREW.****FIGURE 855 A.****SHIP AUGER, WITHOUT SCREW.****FIGURE 855 B.****DOUBLE CUT GIMLET BIT.****FIGURE 856.**

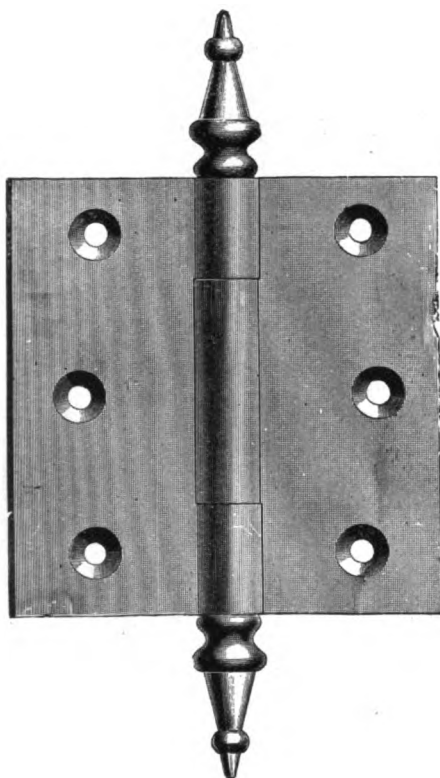
To make rivet holes in Sucker Rods.

HARDWARE.**EXPANSIVE BIT, (CLARK'S).****FIGURE 857.****BRACES.****COMMON.****FIGURE 858.****SPOFFORD'S PATENT.****FIGURE 858 A.****RATCHET.****FIGURE 859.****BUSH HOOK.****FIGURE 860.****CANT HOOK.****FIGURE 860 A.**

HARDWARE.

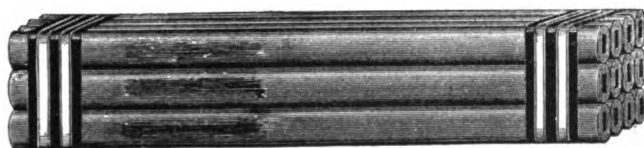
BUTT HINGE, ("ACORN.")

FIGURE 861.



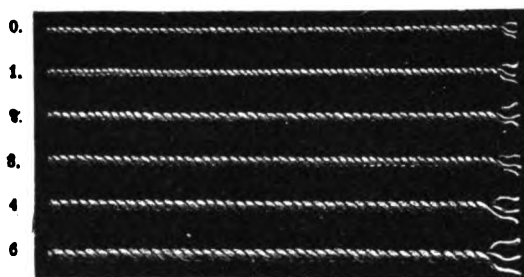
CARPENTERS PENCILS.

FIGURE 862.



CHALK LINES.

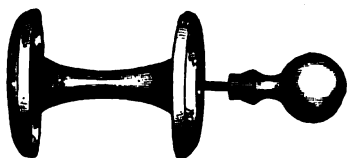
FIGURE 863.



Full Sizes.

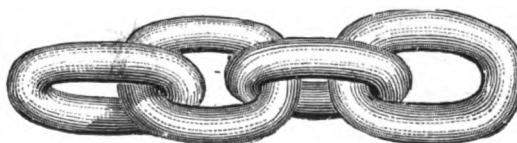
CHALK LINE REEL,
WITH AWL.

FIGURE 864.



CHAIN

FIGURE 865.



CHISEL.

SOCKET FIRMER.

FIGURE 866.



GOUGE.

SOCKET FIRMER.

FIGURE 866 A.



CARPENTERS SLICK.

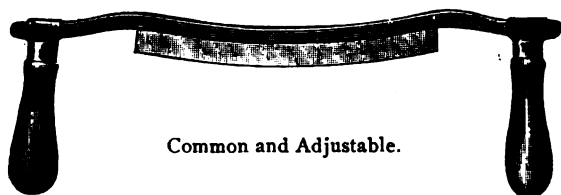
FIGURE 866 B.



HARDWARE.

DRAWING KNIFE.

FIGURE 867.

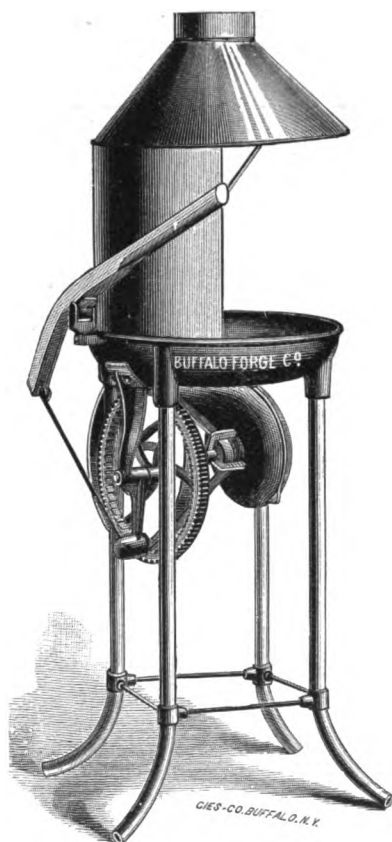


Common and Adjustable.

PORTABLE FORGE.

WITH HOOD.

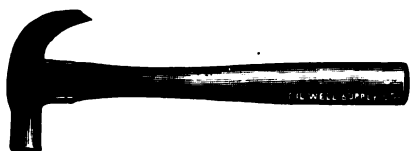
FIGURE 868.



NAIL HAMMER.

"ADZE EYE."

FIGURE 870.



RIVETING HAMMER.

FIGURE 871.



PORTABLE FORGE.

WITHOUT HOOD.

FIGURE 868 A.



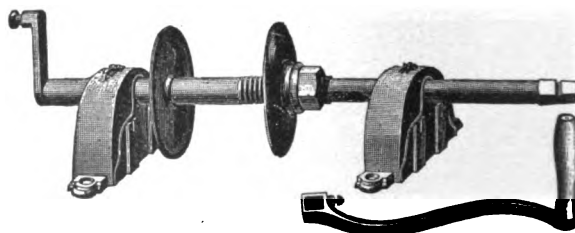
BLOWER.

FIGURE 868 B.



GRINDSTONE FIXTURES.

FIGURE 869.



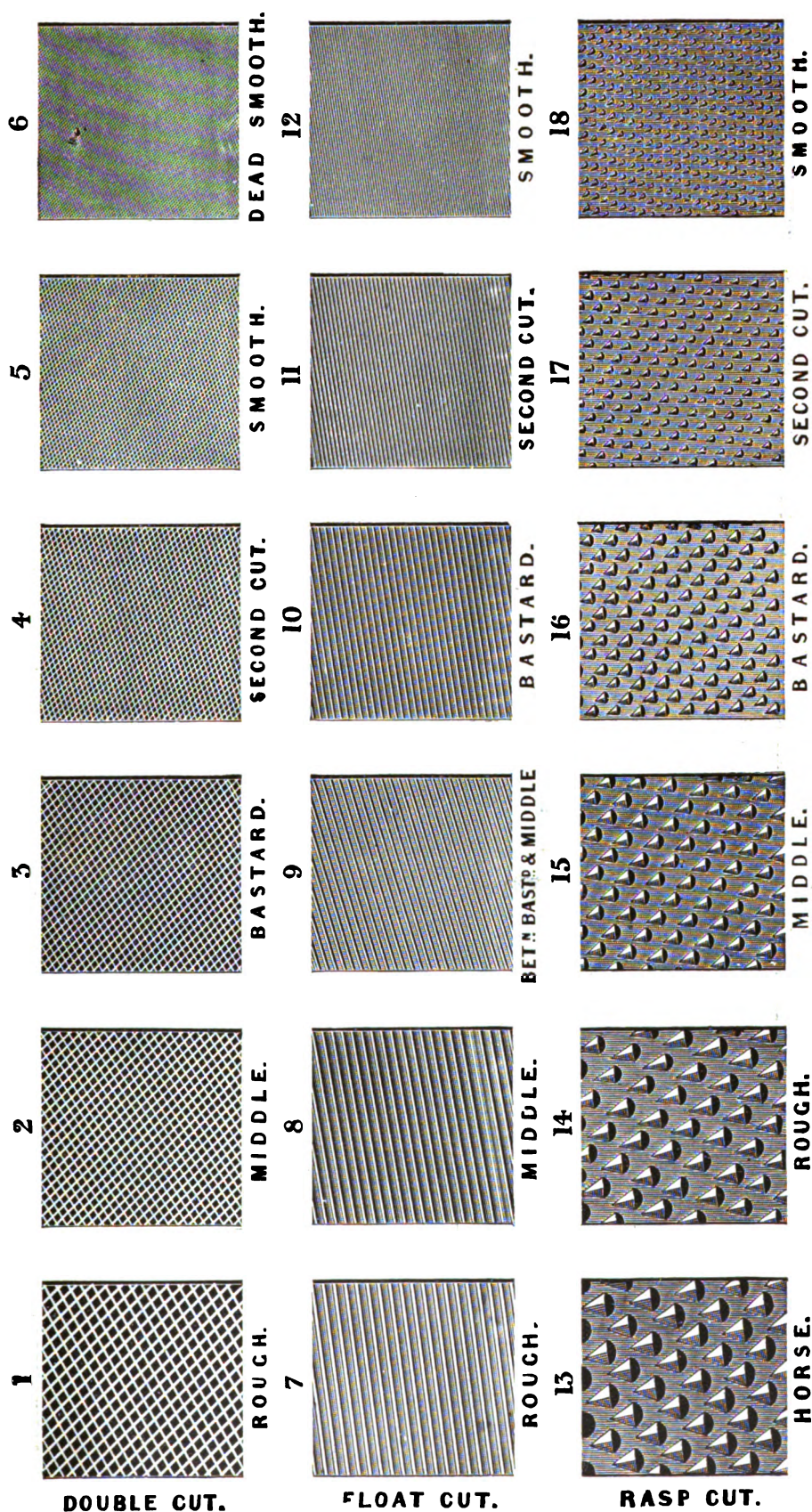
BALL PEEN HAMMER.

FIGURE 872.



FILES.

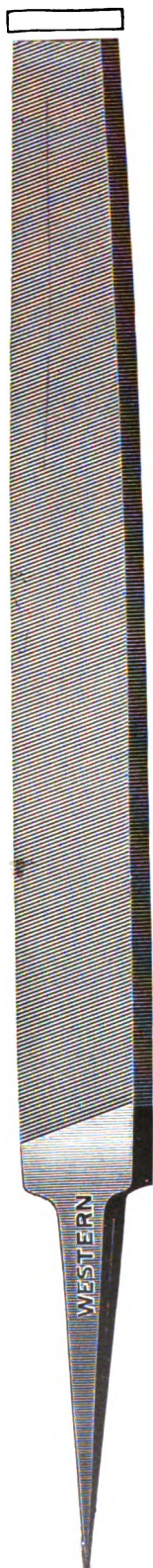
FIGURE 873.



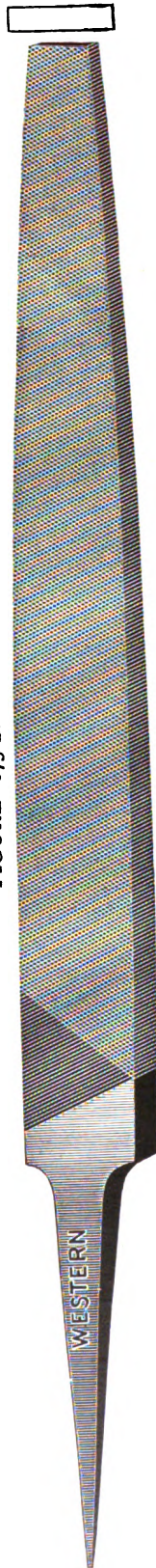
Showing different kinds of file teeth.

FILES.

MILL BASTARD.
FIGURE 873 A.



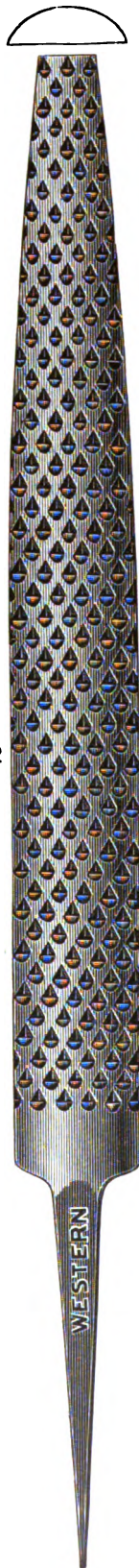
FLAT BASTARD.
FIGURE 873 B.



HALF ROUND BASTARD.
FIGURE 873 C.



HALF ROUND WOOD RASP.
FIGURE 873 D.



SQUARE BASTARD.
FIGURE 873 E.



ROUND BASTARD.
FIGURE 873 F.



TAPER SAW.
FIGURE 873 G.



HARDWARE.

SINGLE BIT AXE HANDLE.

FIGURE 874.



DOUBLE BIT AXE HANDLE.

FIGURE 875.



PICK HANDLE.

FIGURE 876.



SLEDGE HANDLE.

FIGURE 877.



ADZE HANDLE.

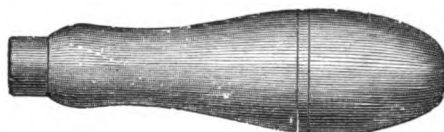
FIGURE 878.



ADZE EYE HAMMER HANDLE.

FIGURE 879.



HARDWARE.**HATCHET HANDLE.****FIGURE 880.****FILE HANDLE.****FIGURE 881.****COMMON AUGER HANDLE.****FIGURE 882.****PATENT AUGER HANDLE.****FIGURE 883.****NAYLORS AUGER HANDLE.****FIGURE 883 C.****SWANS AUGER HANDLE.****FIGURE 883 D.**

HARDWARE.

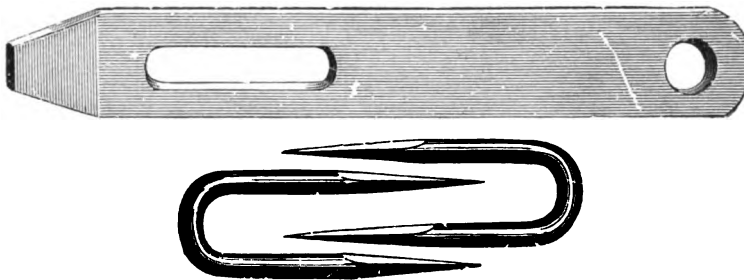
HINGE HASP.

FIGURE 884.



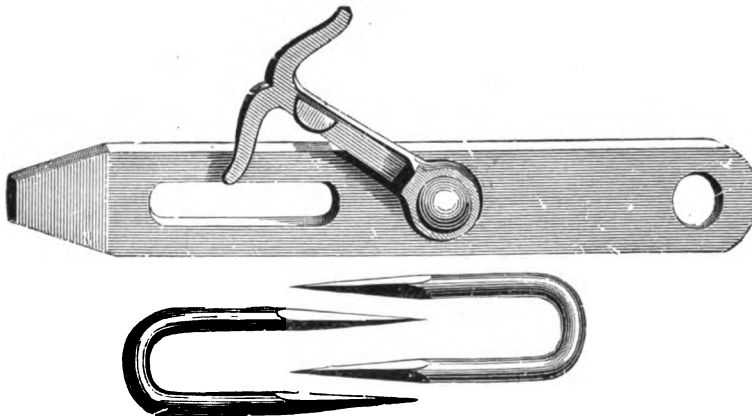
HASP AND STAPLES.

FIGURE 885.



HOOK HASP WITH STAPLES.

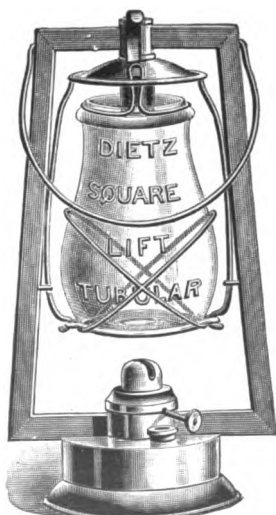
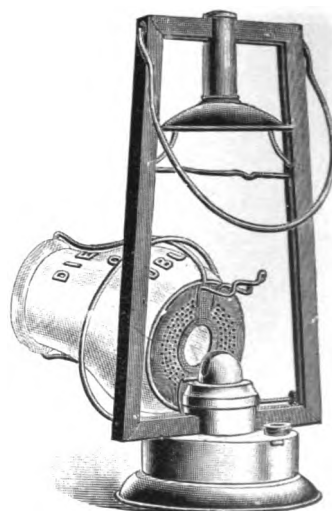
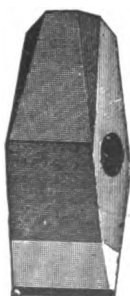
FIGURE 886.



HOOK AND STAPLES.

FIGURE 887.



HARDWARE.**HALF HATCHET.****FIGURE 888.****SHINGLING HATCHET.****FIGURE 889.****BROAD HATCHET.****FIGURE 889 A.****TUBULAR LANTERNS.****FIGURE 891.****Glass Lifted.****FIGURE 891 A****Glass Thrown Back.****HOOP DRIVER.****FIGURE 890.**

HARDWARE.

RIM DOOR LOCK.

FIGURE 892.



KNOBS.

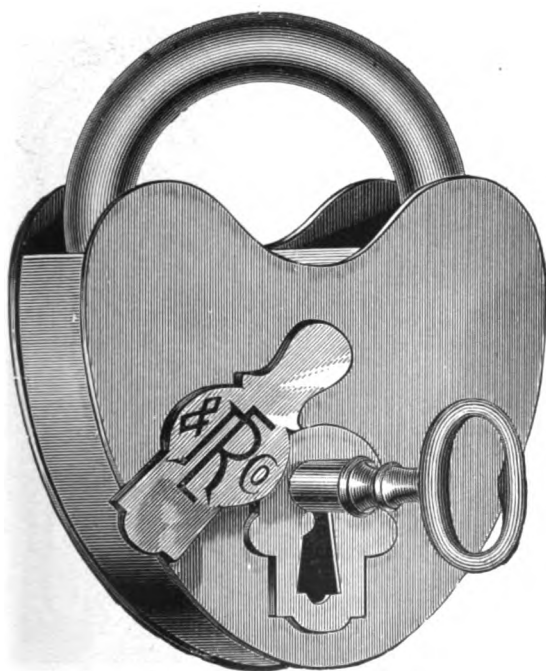
FIGURE 893.



Mineral or Porcelain.

PAD LOCKS.

FIGURE 894.



Iron, No. 205, 2½ inch.

FIGURE 895.



Iron, No. 1210, 3 inch Flat Key.

PAD LOCKS.

FIGURE 896.

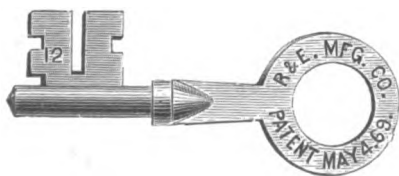


Iron, No. 1232, 2½ inch Flat Key.

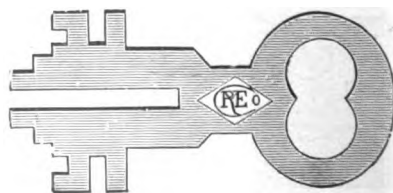
FIGURE 897.



FIGURE 898.



Iron, No. 1219, 2½ inch Flat Key.



Iron, No. 1234, 2½ inch Double Key.

PAD LOCKS.

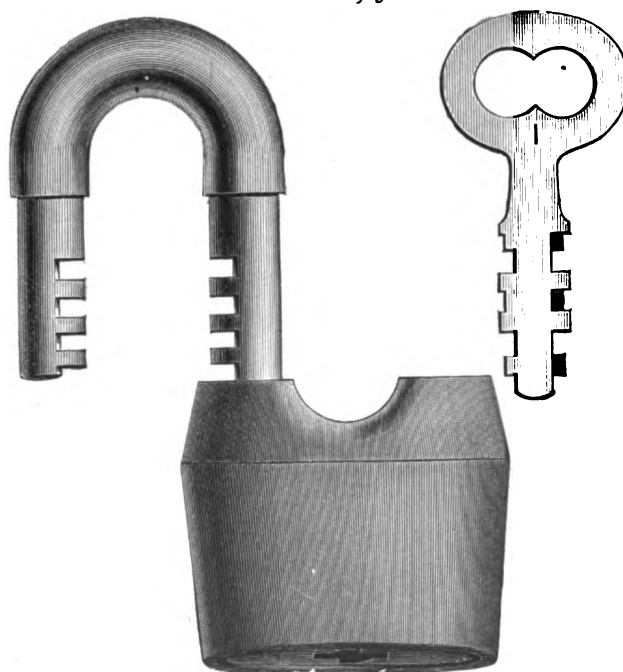
FIGURE 899.



Iron, No. 1237, $2\frac{1}{4}$ inch Double Key.

JAIL LOCK.

FIGURE 903.



Iron, No. 1664.

PAD LOCKS.

JAIL LOCK.

FIGURE 903 A.



Iron, No. 1665.

CHAMPION LOCKS.

FIGURE 903 C.

 $2\frac{1}{4}$ Inch.

Brass.

FIGURE 903 D.

 $2\frac{1}{4}$ Inch, with Chain

HARDWARE.

MALLEABLE IRON OILERS.

NEW STYLE.

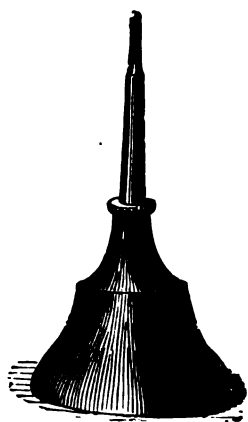
SECTION.

FIGURE 904 A.

FIGURE 904 B.

OLD STYLE.

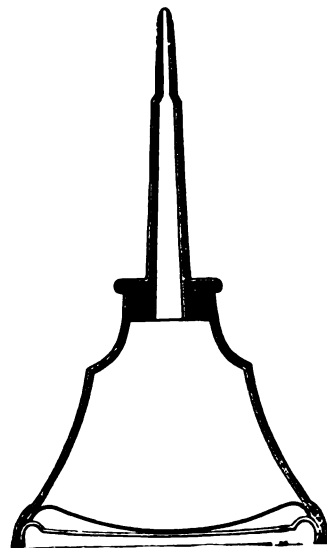
FIGURE 904.



No. 1.— $3\frac{1}{4}$ inches in diameter.
 " 3.— $3\frac{3}{8}$ " " "

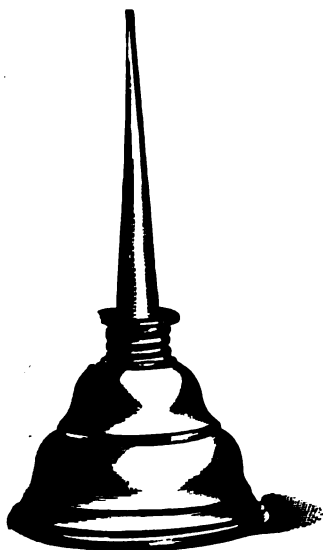


No. 12.— $3\frac{5}{8}$ inches in diameter.
 " 13.— $3\frac{3}{8}$ " " "



COMMON OILER.

FIGURE 906.



Zink or Brass.

STEEL OILERS.

FIGURE 906 A.

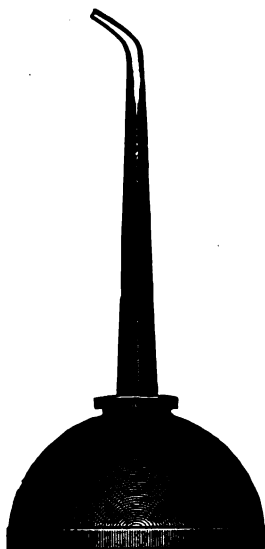
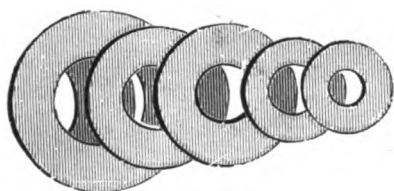
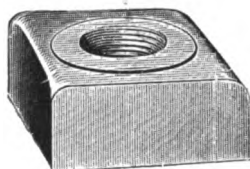
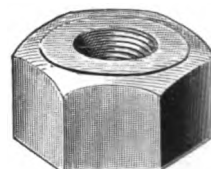


FIGURE 906 B.



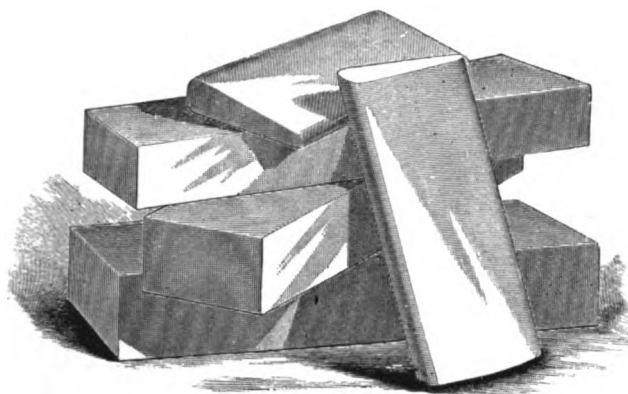
No. 13.— $3\frac{3}{8}$ in diameter, 3 inch Nozzle.
 " 14.— $3\frac{3}{8}$ " " 9 " "

HARDWARE.**MACHINE BOLT.****FIGURE 907.****DOUBLE END BOLT.****FIGURE 907 A.****CARRIAGE BOLT.****FIGURE 907 B.****LAG SCREW.****FIGURE 907 C.****WASHERS.****FIGURE 908.****SQUARE.****FIGURE 909.****NUTS.****HEXAGON.****FIGURE 910.****TWIST DRILLS.****TAPER SHANK.****FIGURE 911.****STRAIGHT SHANK.****FIGURE 911 A.****BIT SHANK.****FIGURE 911 B.**

HARDWARE.

OIL STONES.

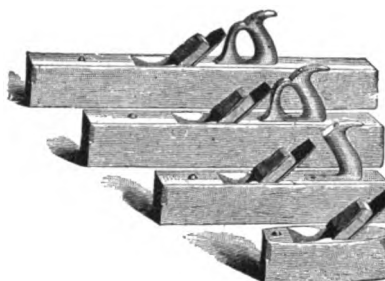
FIGURE 912.



Stones and Slips.

PLANES.

FIGURE 913.



Smooth, Jack, Fore and Jointer.

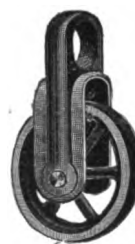
PLUMB AND LEVEL.

FIGURE 914.



CLOTHES LINE PULLEY.

FIGURE 915.



3 inch.

HAY FORK PULLEY.

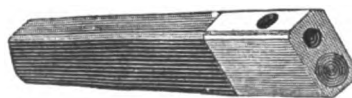
FIGURE 916.



5 inch.

RIVET SET.

FIGURE 918.



HARDWARE.

CALIPER RULE "6 INCH."

FIGURE 919.



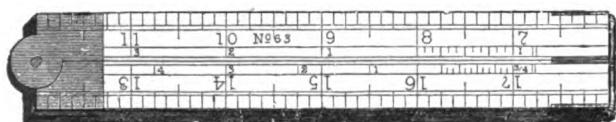
COMMON RULE "12 INCH."

FIGURE 920.



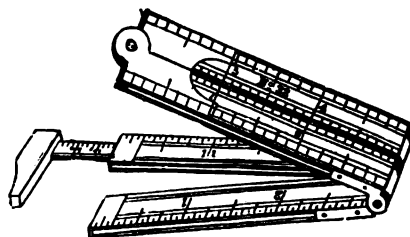
COMMON RULE "24 INCH."

FIGURE 921.



CALIPER RULE "12 INCH."

FIGURE 922.



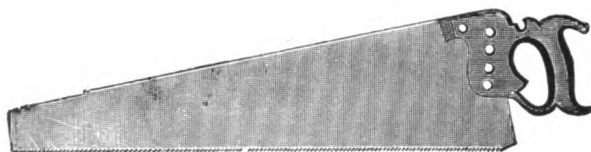
CROSS CUT SAW.

FIGURE 923.



HAND SAW "DISSTON'S."

FIGURE 924.



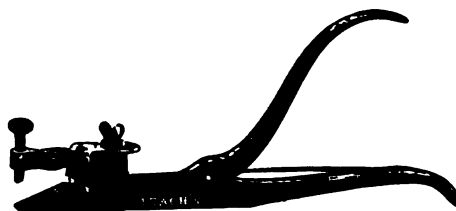
COMPASS SAW.

FIGURE 925.



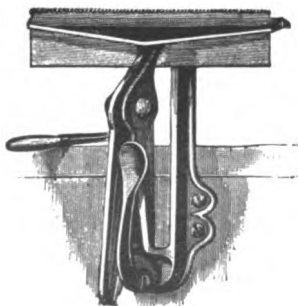
SAW SET.

FIGURE 927.



SAW VISE "STEARNS."

FIGURE 926.



SCRATCH AWL.

FIGURE 928.



HARDWARE.

COMMON SHOVEL.

FIGURE 929.



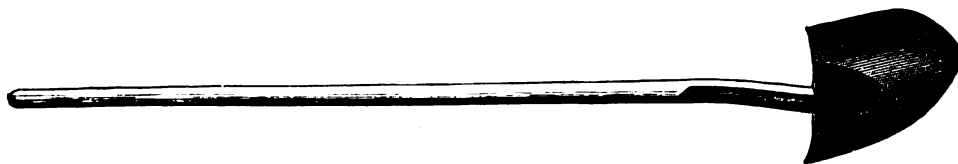
PATENT SHOVEL.

FIGURE 930.



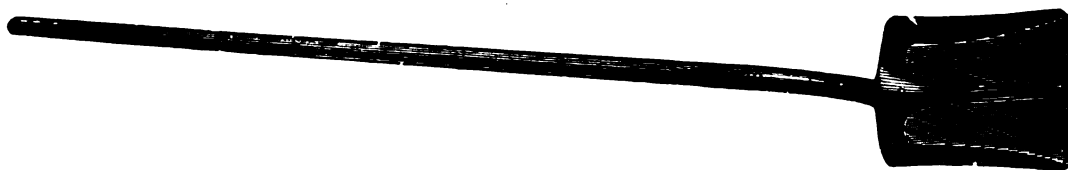
LONG HANDLE SHOVEL, ROUND POINT.

FIGURE 930 A.



LONG HANDLE SHOVEL, SQUARE POINT.

FIGURE 930 B.



SCOOP.

FIGURE 931.



HARDWARE.

STRAP HINGE.

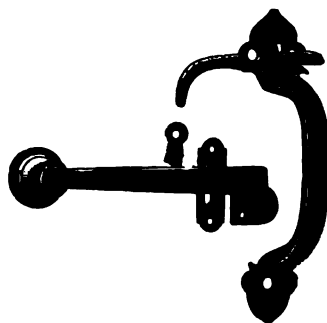
FIGURE 932.



Light or Heavy.

THUMB LATCH.

FIGURE 933.



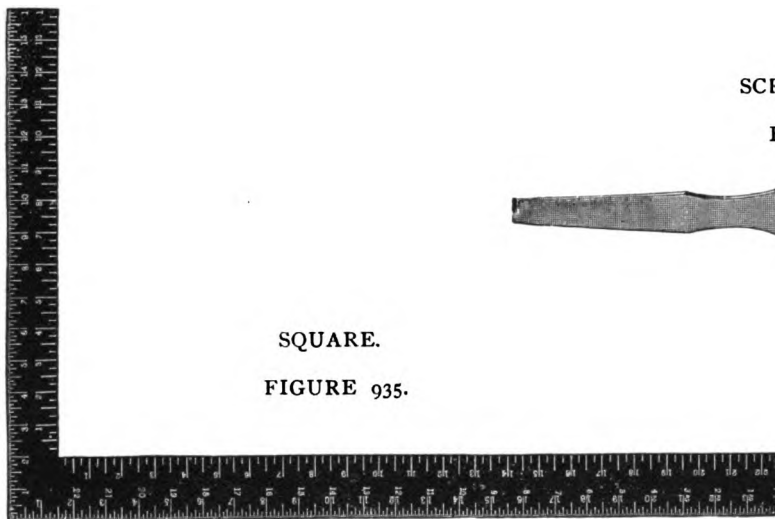
SCREW DRIVER.

FIGURE 934.



SQUARE.

FIGURE 935.



Iron or Steel.

TAPE MEASURE.

FIGURE 936.



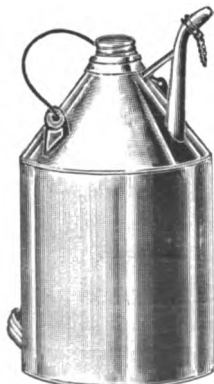
Asses' Skin.

TIN WARE.

OIL CANS.

REGULAR.

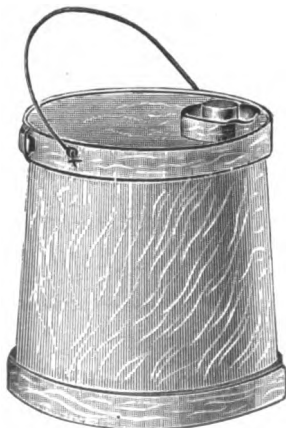
FIGURE 937.



1 Gallon.

WOOD JACKET.

FIGURE 937 A.



1 to 5 Gallons.

DINNER PAIL.

FIGURE 938.

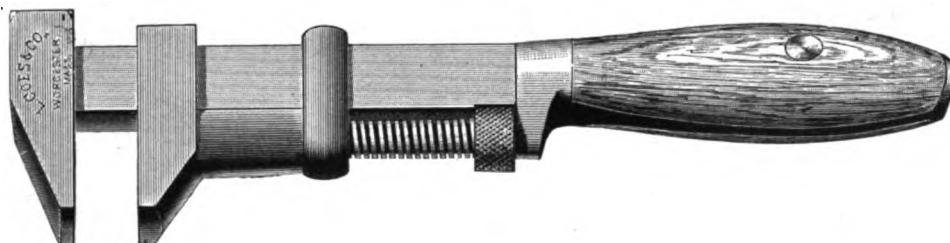


6 Quart.

WRENCHES.

COMMON MONKEY WRENCH,—COE'S PATENT.

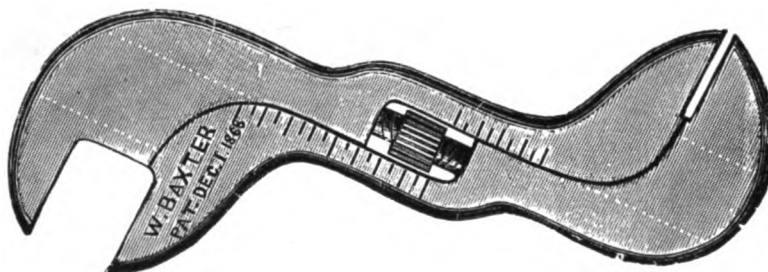
FIGURE 939.



Black or Polished.

BAXTER'S "S" WRENCH.

FIGURE 940.



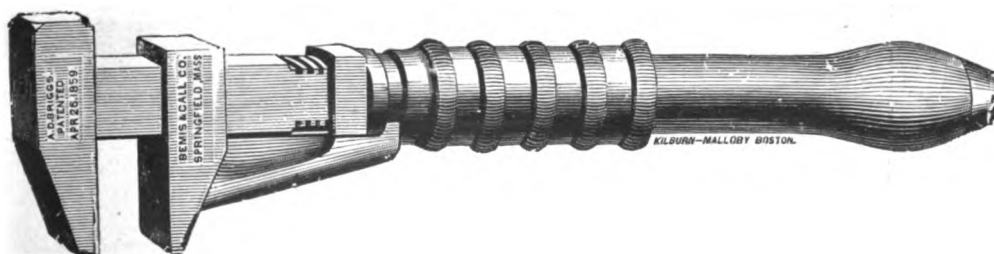
BAXTER'S "DIAGONAL" WRENCH.

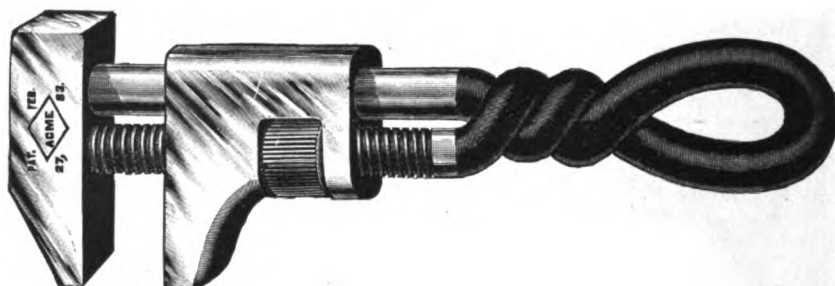
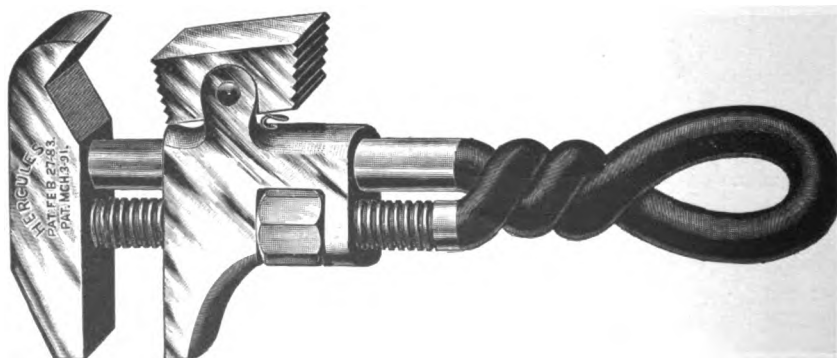
FIGURE 940 A.



"BRIGG'S" SLEEVE WRENCH.

FIGURE 942.



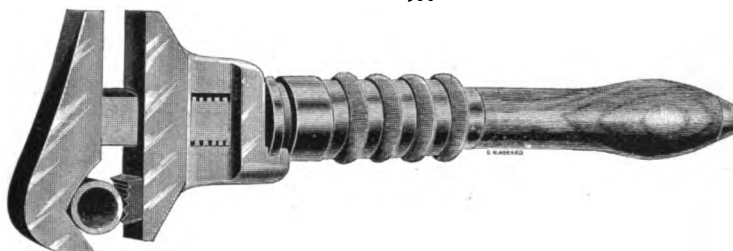
WRENCHES.**"ACME" STEEL WRENCH.****FIGURE 948.****ADJUSTABLE "S" WRENCH.****FIGURE 949.****"KEY" WRENCH.****FIGURE 950.****"HERCULES" COMBINATION WRENCH.****FIGURE 954.**

WRENCHES.

"BRIGG'S" COMBINATION WRENCH.

(FORMERLY FIGURE 941).

FIGURE 955.



"FRANKLIN" PIPE WRENCH.

FIGURE 958.

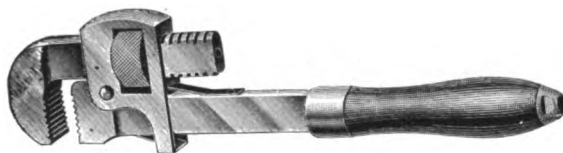


6 inch Wrench takes	$\frac{1}{8}$ to $\frac{1}{2}$ inch Pipe.
8 " " "	$\frac{1}{8}$ " $\frac{3}{4}$ " "
10 " " "	$\frac{1}{8}$ " 1 " "
14 " " "	$\frac{1}{4}$ " $1\frac{1}{2}$ " "

18 inch Wrench takes	$\frac{1}{4}$ to 2 inch Pipe.
24 " " "	$\frac{1}{4}$ " $2\frac{1}{2}$ " "
36 " " "	$\frac{1}{2}$ " $3\frac{1}{2}$ " "
48 " " "	1 " 5 " "

"STILLSON'S" PIPE WRENCH.

FIGURE 959.

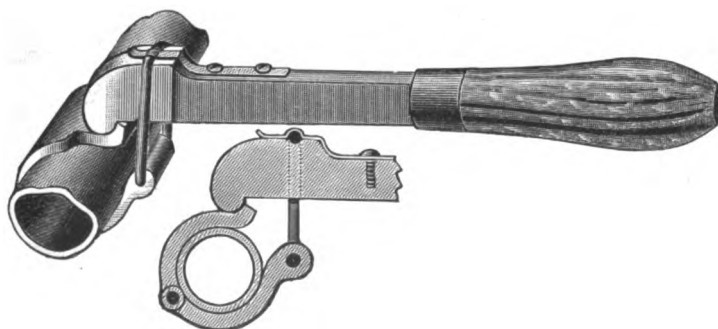


6 inch Wrench takes	$\frac{1}{8}$ to $\frac{1}{2}$ inch Pipe.
8 " " "	$\frac{1}{8}$ " $\frac{3}{4}$ " "
10 " " "	$\frac{1}{8}$ " 1 " "
14 " " "	$\frac{1}{4}$ " $1\frac{1}{4}$ " "

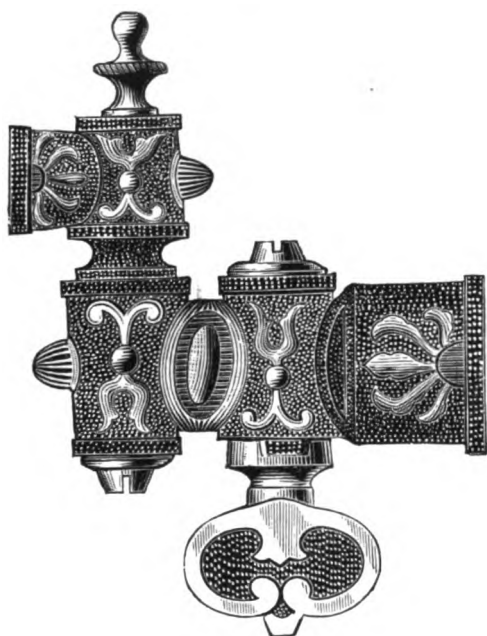
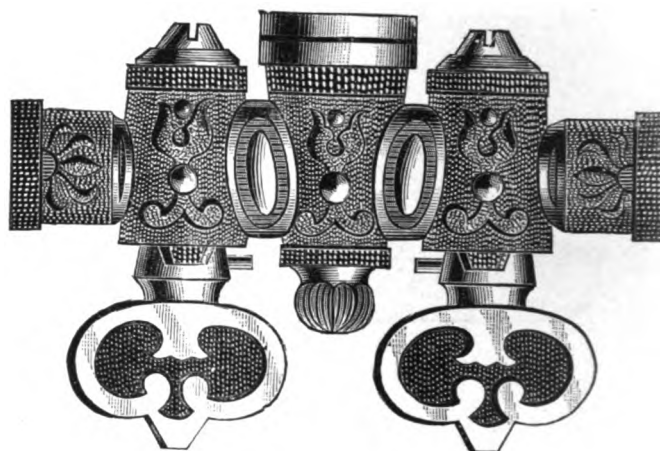
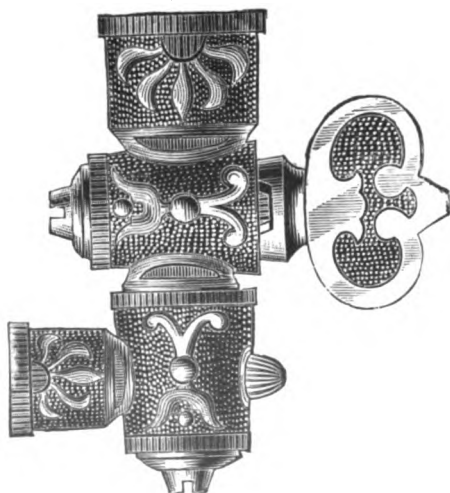
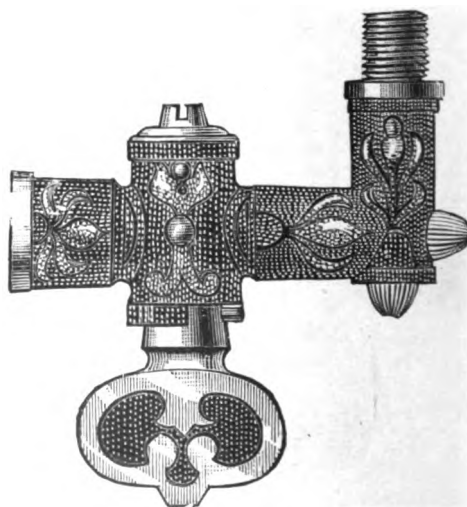
18 inch Wrench takes	$\frac{1}{4}$ to 2 inch Pipe.
24 " " "	$\frac{1}{4}$ " $2\frac{1}{2}$ " "
36 " " "	$\frac{1}{2}$ " $3\frac{1}{2}$ " "
48 " " "	1 " 5 " "

"HAYDEN'S" WRENCH FOR BRASS PIPE.

FIGURE 961



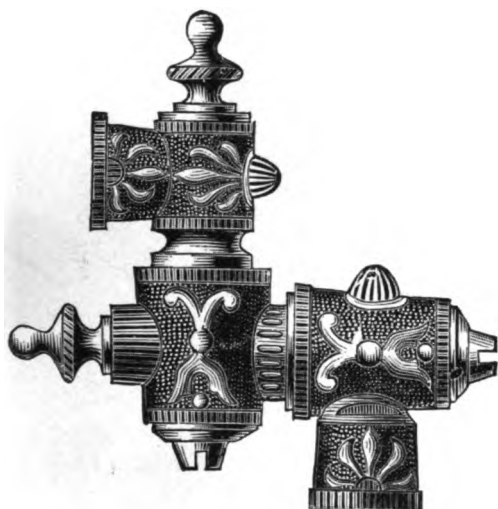
No. 2.—10 inch Wrench, bar is adapted to clamps for $\frac{1}{8}$, $\frac{3}{4}$ and 1 inch Pipe.
 " 3.—18 " " " " " " $1\frac{1}{4}$, $1\frac{1}{2}$ " 2 " "

BRASS GAS-FIXTURE FITTINGS.**BRACKET COCK.****FIGURE 965.****TWO-LIGHT PENDANT COCK.****FIGURE 966.****REVOLVING COCK.****FIGURE 967.****ELBOW BURNER COCK.****FIGURE 968.**

BRASS GAS-FIXTURE FITTINGS.

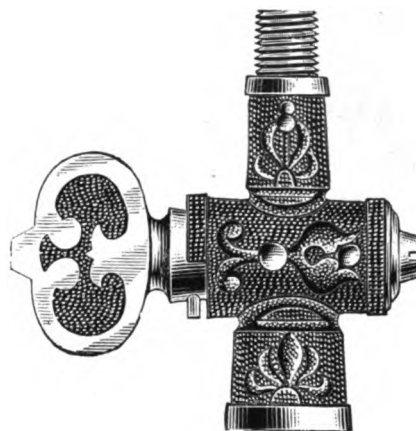
UNIVERSAL SWING.

FIGURE 969.



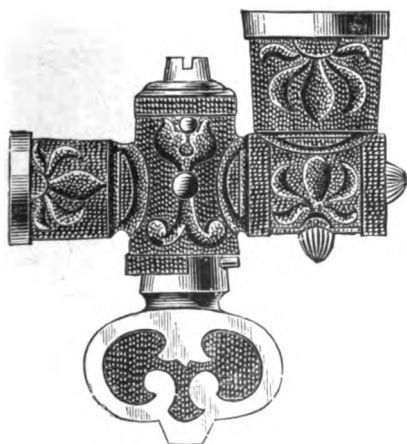
PILLAR COCK.

FIGURE 970.



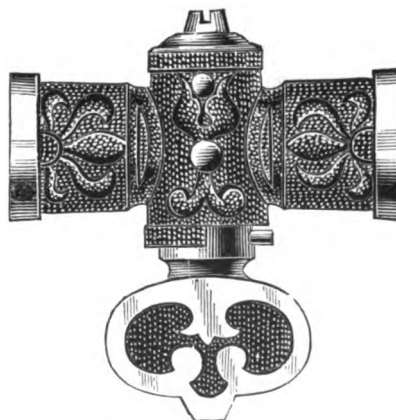
ELBOW PENDANT COCK.

FIGURE 971.



STRAIGHT COCK.

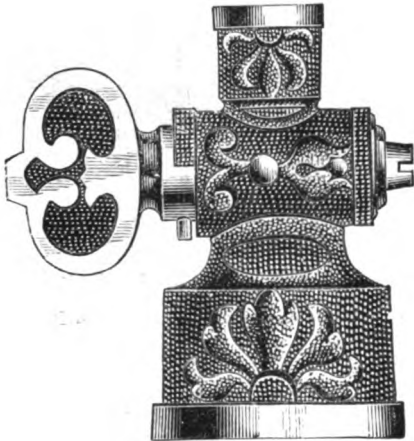
FIGURE 972.



BRASS GAS-FIXTURE FITTINGS.

STREET LAMP COCK.

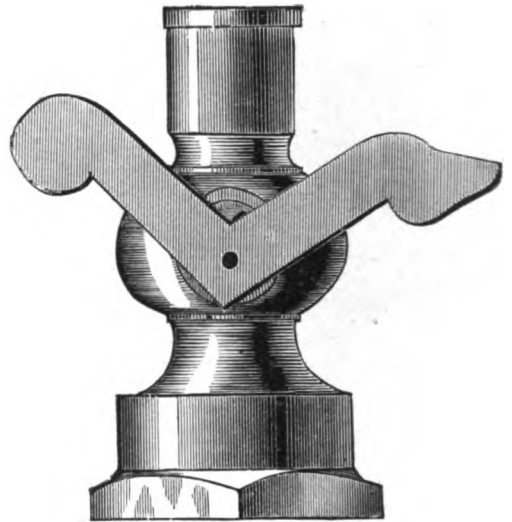
FIGURE 973.



STREET LAMP COCK.

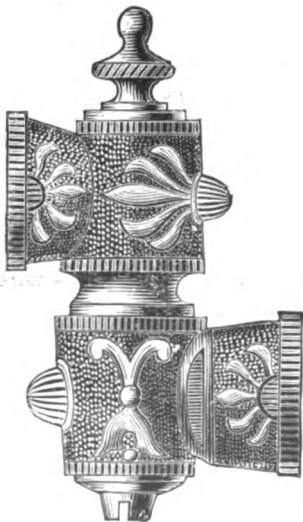
WITH LEVER.

FIGURE 974.



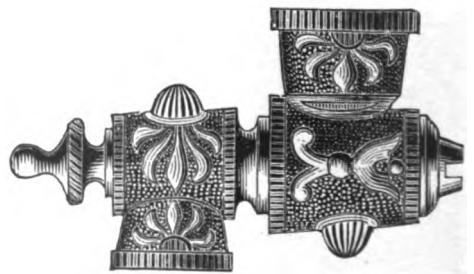
MIDDLE SWING.

FIGURE 975.



TOP SWING.

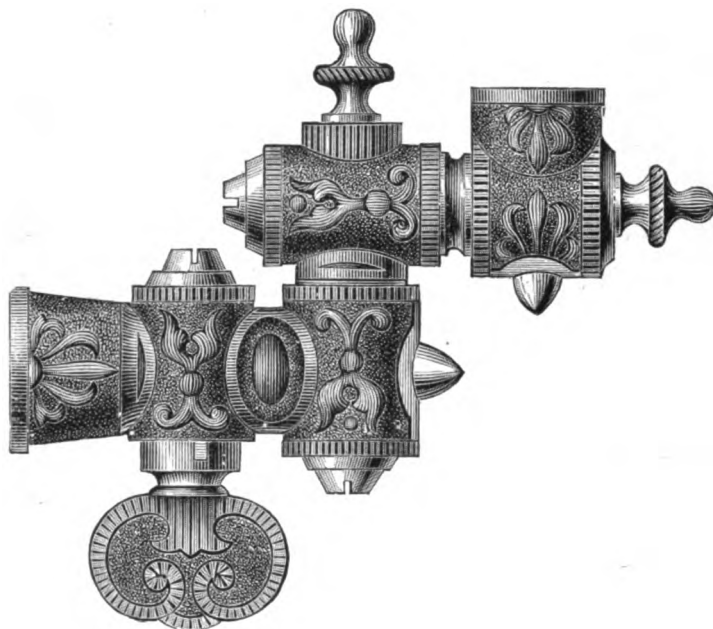
FIGURE 976.



BRASS GAS-FIXTURE FITTINGS.

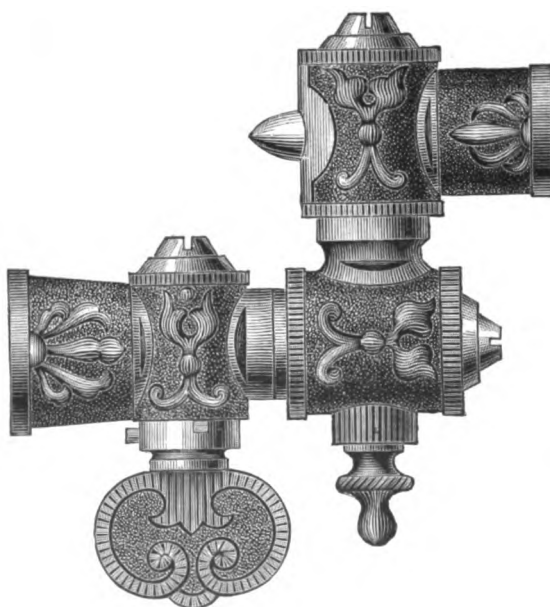
UNIVERSAL BRACKET COCK.

FIGURE 977.



UNIVERSAL REVOLVING COCK.

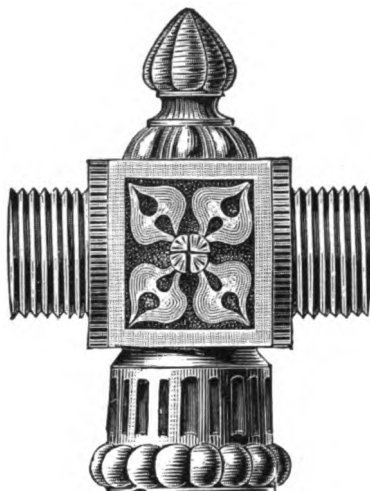
FIGURE 978.



BRASS GAS-FIXTURE FITTINGS.

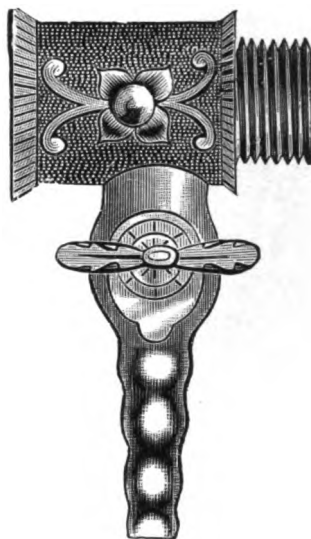
TWO-LIGHT PILLAR BODY.

FIGURE 979.



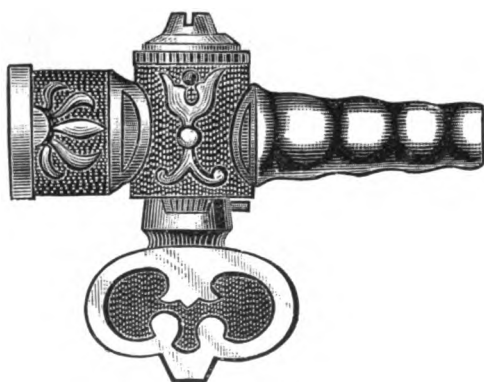
INDEPENDENT COCK.

FIGURE 980.



HOSE COCK.

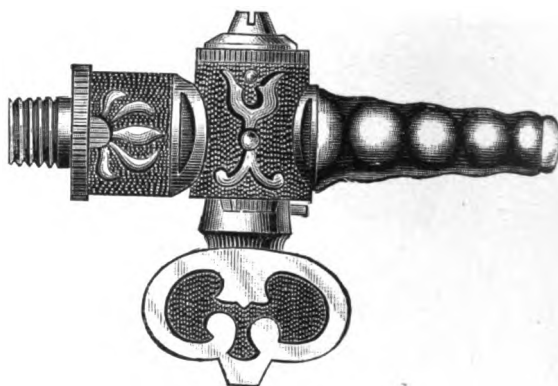
FIGURE 981.



Female.

HOSE COCK.

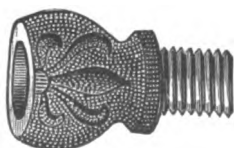
FIGURE 982.



Male.

STRAIGHT NOZZLE.

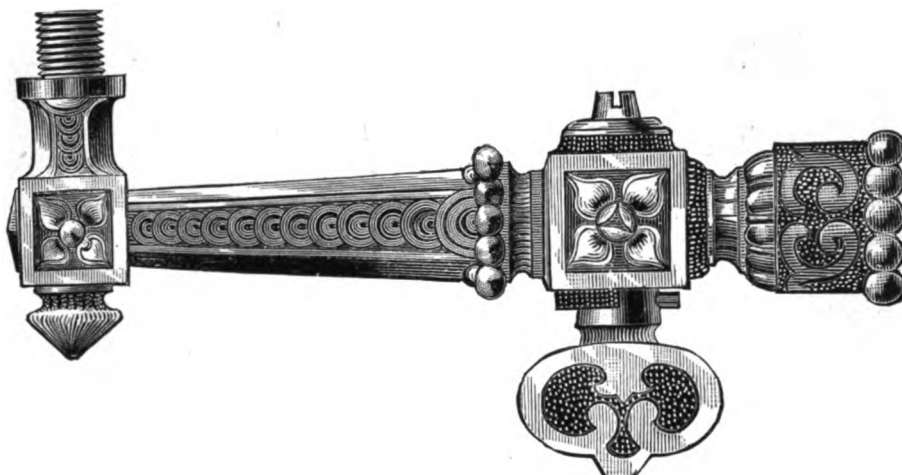
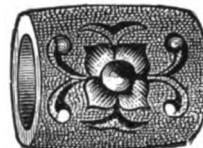
FIGURE 983.

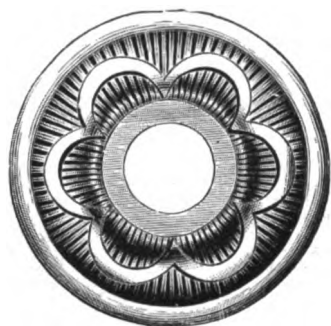
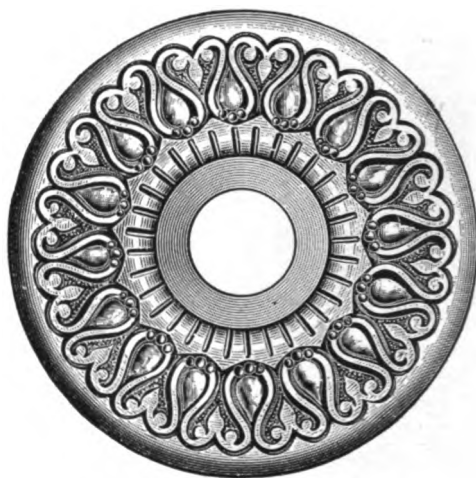
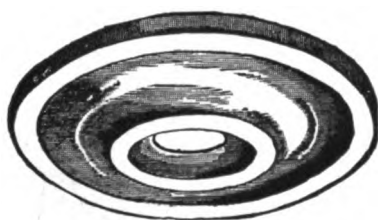
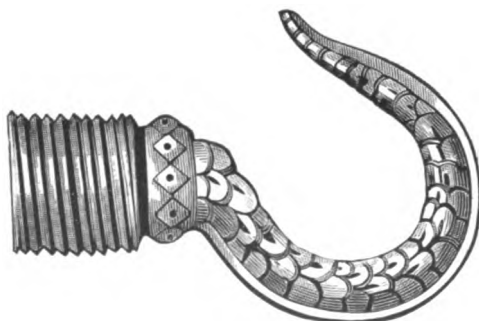
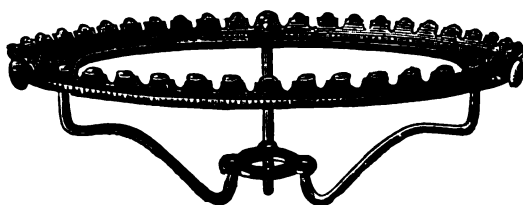


SIDE NOZZLE.

FIGURE 984.



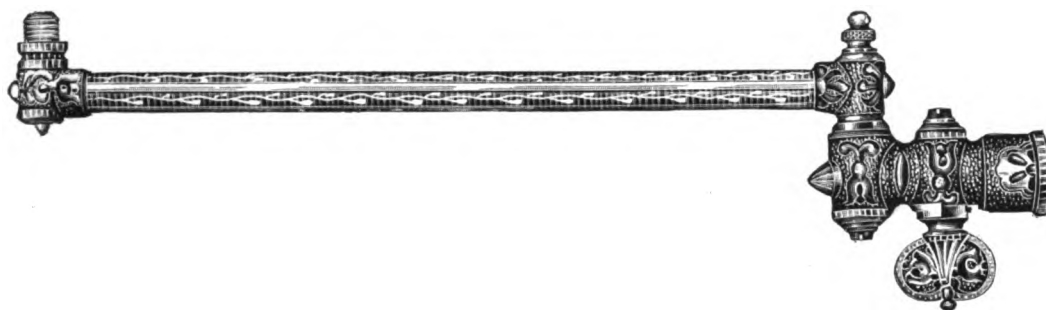
BRASS GAS-FIXTURE FITTINGS.**HEAVY ELBOW BURNER COCK.****FIGURE 985.**Size..... $\frac{3}{8}$ inch.Length..... $4\frac{3}{8}$ inch.**STIFF JOINT.****FIGURE 986.****CONNECTING BALL.****FIGURE 987.****TWO-LIGHT BRACKET BODY.****FIGURE 988.**

BRASS GAS-FIXTURE FITTINGS.**BURNER CUP.****FIGURE 989.****BRACKET BACK.****FIGURE 990.****CEILING PLATE.****FIGURE 991.****SPUN CHECK.****FIGURE 992.****CHANDELIER HOOK.****FIGURE 993.****Male or Female.****GLOBE HOLDER.****FIGURE 994.**

GAS BRACKETS.

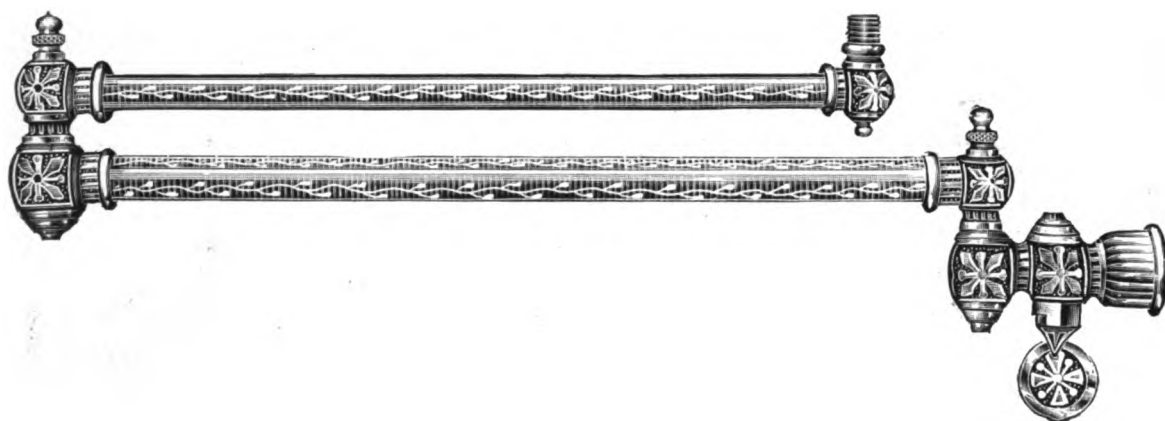
SINGLE SWING.

FIGURE 995.



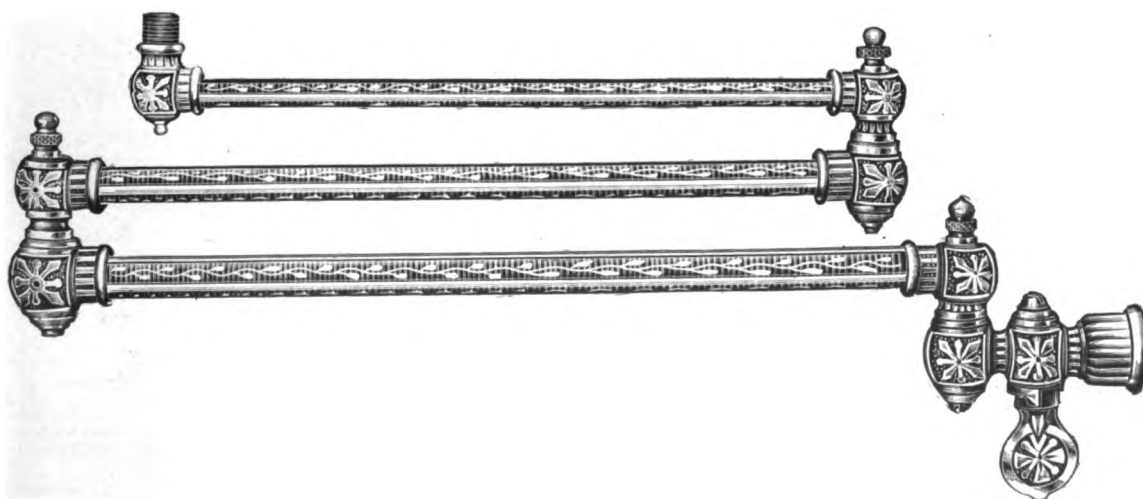
DOUBLE SWING.

FIGURE 996.



TRIPLE SWING.

FIGURE 997.

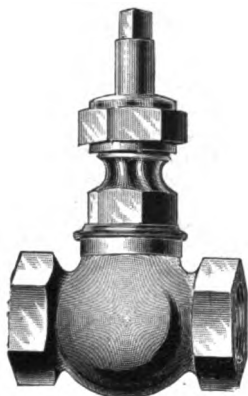


SPECIAL VALVES FOR NATURAL GAS.

TESTED BY AIR TO 100 POUNDS.

VALVES WITH $\frac{1}{4}$ INCH SQUARE ON STEM.

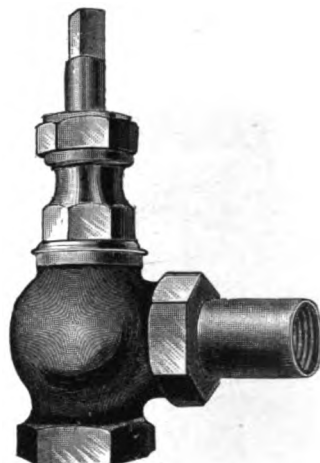
GLOBE.
FIGURE 1000.



ANGLE.
FIGURE 1001.

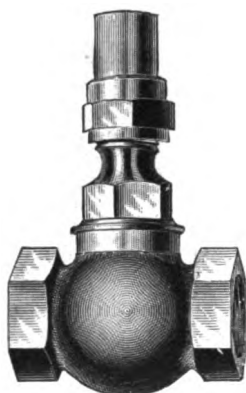


ANGLE, WITH UNION.
FIGURE 1002.



LOCK SHIELD VALVES WITH $\frac{1}{4}$ INCH SQUARE ON STEM.

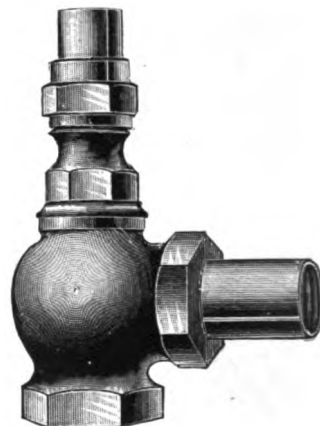
GLOBE.
FIGURE 1005.



ANGLE.
FIGURE 1006.

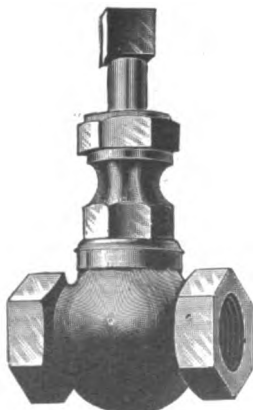


ANGLE, WITH UNION.
FIGURE 1007.



VALVES WITH $\frac{1}{2}$ INCH SQUARE ON STEM.

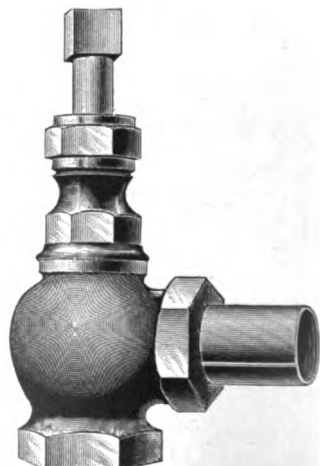
GLOBE.
FIGURE 1010.



ANGLE.
FIGURE 1010 A.



ANGLE, WITH UNION.
FIGURE 1010 B.

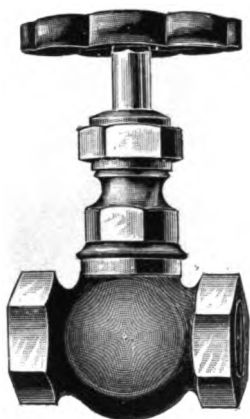


SPECIAL VALVES FOR NATURAL GAS.

TESTED BY AIR. TO 100 POUNDS.

VALVES WITH IRON WHEELS.

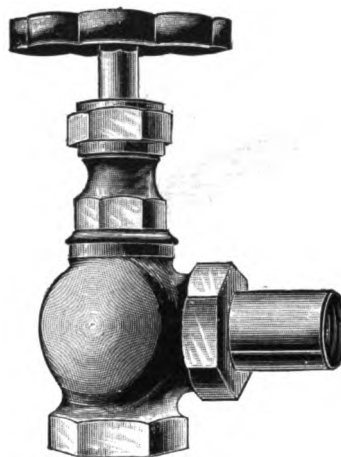
GLOBE.
FIGURE 1011.



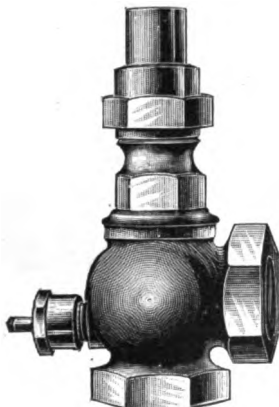
ANGLE.
FIGURE 1011 A.



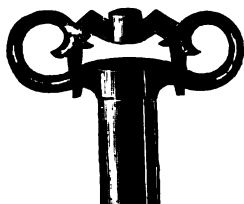
ANGLE, WITH UNION.
FIGURE 1011 B.



COMPLETE.
FIGURE 1012.

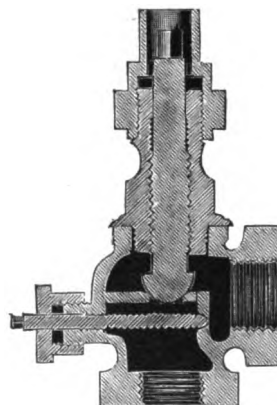


COMBINATION KEY FOR VALVE.
FIGURE 1012 A.

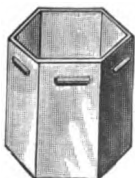


This Valve has an independent Needle Point, Stem and Seat, allowing sufficient gas to escape to the Burner to keep a continuous light.

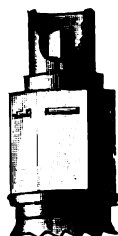
SECTION.
FIGURE 1012 B.



PROTECTOR.
FIGURE 1013.

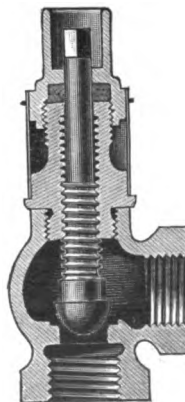


SECTION.
FIGURE 1013 A.



Showing Protector as applied to Lock Shield Valves.

SECTION,
FIGURE 1013 B.



BRASS NATURAL GAS COCKS, &c.

FLAT HEAD,
WITHOUT STOP ON PLUG.

FIGURE 1018.



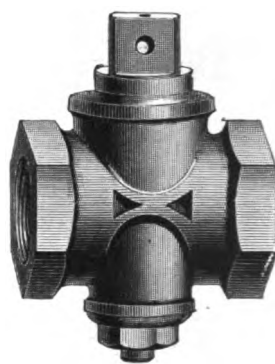
SQUARE HEAD,
WITH STOP ON PLUG.

FIGURE 1019.



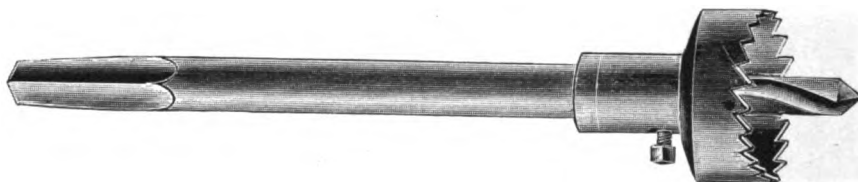
FLAT HEAD,
No. 1 1/2 PATTERN.

FIGURE 1020.



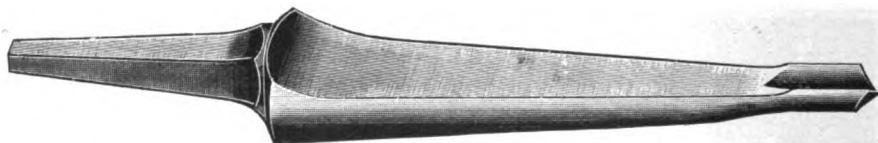
STOVE DRILL.

FIGURE 1023.



STOVE DRILL AND REAMER COMBINED.

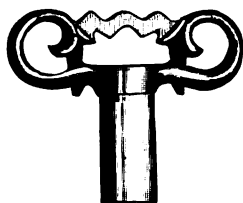
FIGURE 1024.



VALVE AND COCK KEYS.

SMALL BRASS KEY.
1/4 INCH SQUARE HOLE.

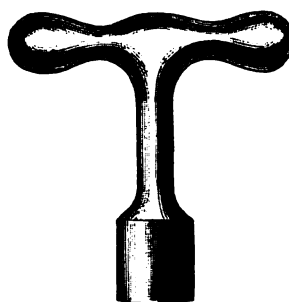
FIGURE 1025.

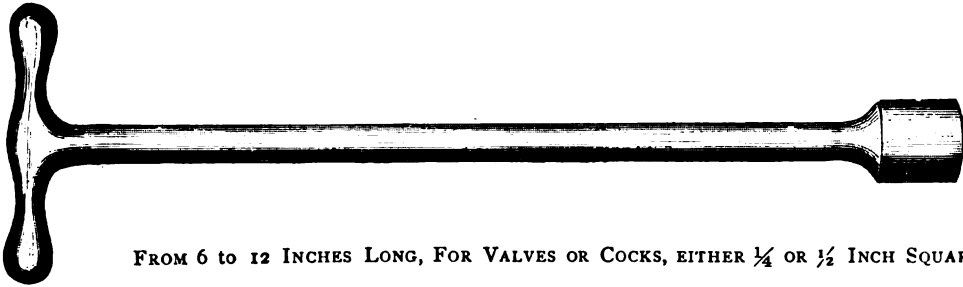
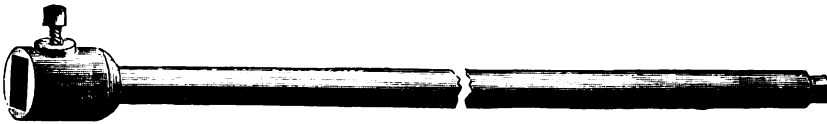
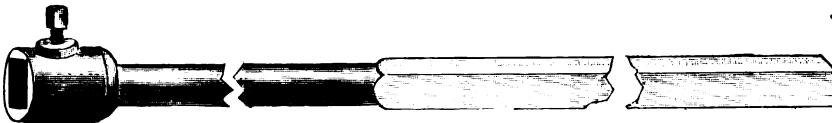
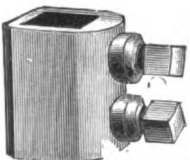
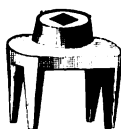


For Valves with 1/4 inch square on stem, and
for Lock Shield Valves.

BRASS KEY.
3 INCHES LONG, 1/2 SQUARE HOLE.

FIGURE 1027.



KEYS, EXTENSION RODS, &c.**BRASS KEY.****FIGURE 1028.**FROM 6 to 12 INCHES LONG, FOR VALVES OR COCKS, EITHER $\frac{1}{4}$ OR $\frac{1}{2}$ INCH SQUARE HOLE.**POWELL'S PATENT EXTENSION ROD.****FIGURE 1029.**No. 1 for Cocks with $\frac{1}{2}$ inch Square Hole,
" 2 " Valves " $\frac{1}{4}$ " " "**BRASS EXTENSION ROD.** $\frac{1}{2}$ INCH SQUARE HOLE.**FIGURE 1030.****MALLEABLE IRON EXTENSION ROD.****FIGURE 1031.**16 INCHES LONG, $\frac{1}{2}$ INCH SQUARE HOLE. CAN BE CUT DOWN TO 7 INCHES.**BRASS SOCKET.****FIGURE 1033.** $\frac{1}{4}$ or $\frac{1}{2}$ Inch Square Hole.
2 Set Screws.**BRASS PRONG.****FIGURE 1034.****BRASS FLOOR PLATES.****FIGURE 1035.** $\frac{1}{4}$ or $\frac{1}{2}$ Inch Hole.

NATURAL GAS FUEL BURNERS.

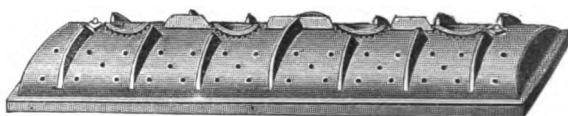
COMMON TUBE.

FIGURE 1041.



OVAL TOP.

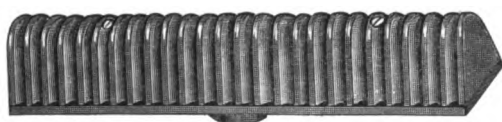
FIGURE 1042.



CORRUGATED.

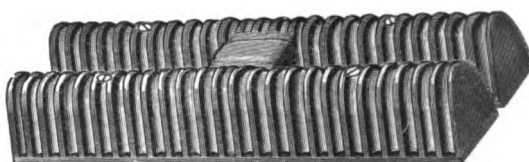
SINGLE.

FIGURE 1043.



DOUBLE.

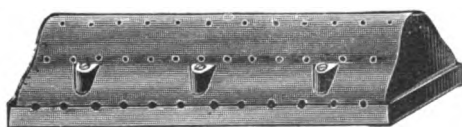
FIGURE 1044.



DRILLED HOLES.

RECTANGULAR.

FIGURE 1045.



DRILLED HOLES.

ROUND.

FIGURE 1045 A.

HOLLAND'S,
RECTANGULAR.

FIGURE 1046.

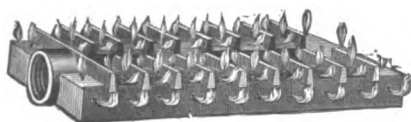
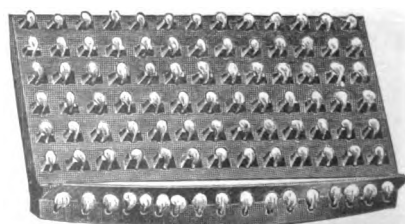
HOLLAND'S INCLINE,
FOR GRATE.

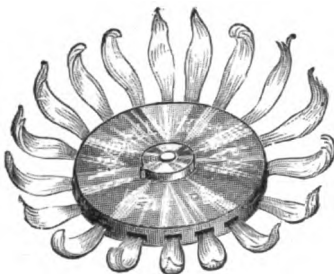
FIGURE 1046 A.



NATURAL GAS FUEL BURNERS.

HOLLAND'S, ROUND.

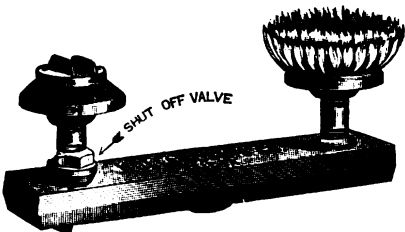
FIGURE 1046 B.



HOLLAND'S,

FOR SUMMER USE.

FIGURE 1046 C.



SUNFLOWER STOVE.

No. 6.

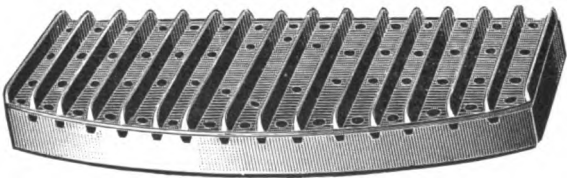
FIGURE 1047 A.



SUNFLOWER GRATE.

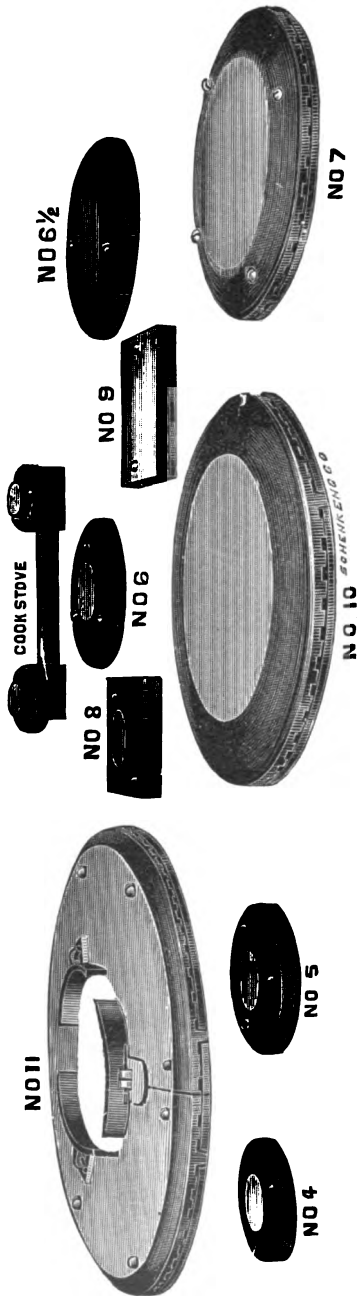
OVAL FRONT.

FIGURE 1047 B.



SUNFLOWER BURNERS.

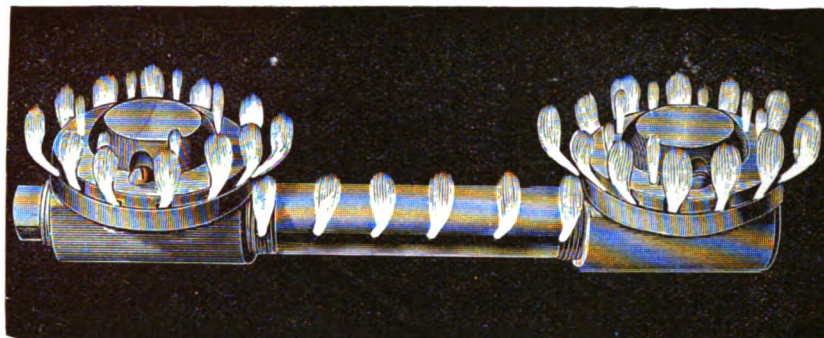
FIGURE 1047.



NATURAL GAS FUEL BURNERS.

SUNFLOWER COOK STOVE, DOUBLE.

FIGURE 1047 D.

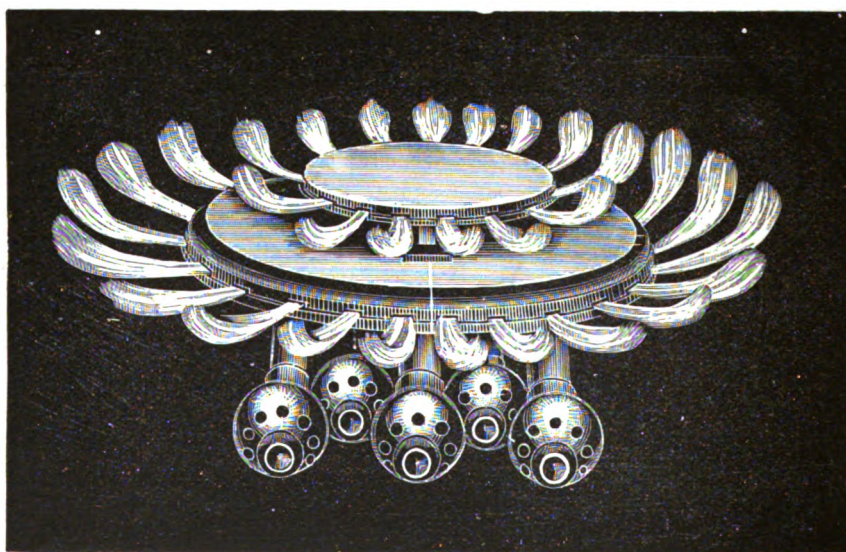


The pipe connections shown, not furnished unless ordered extra.

SUNFLOWER STOVE, DOUBLE.

COMBINATION OF No. 11 AND No. 7.

FIGURE 1047 E.



The pipe connections and mixers shown are not furnished unless ordered extra.

SUNFLOWER STOVE.

No. 7.

FIGURE 1047 F.



NATURAL GAS FUEL BURNERS.

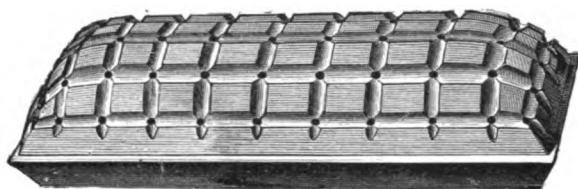
"COMMON" RING.

FIGURE 1048.



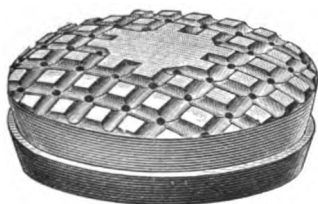
"SALAMANDER" LONG.

FIGURE 1049.



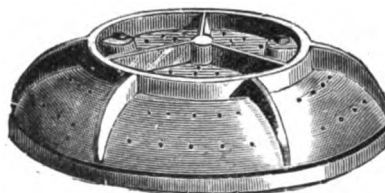
"SALAMANDER" ROUND.

FIGURE 1049 A.



"COMMON" ROUND.

FIGURE 1050.



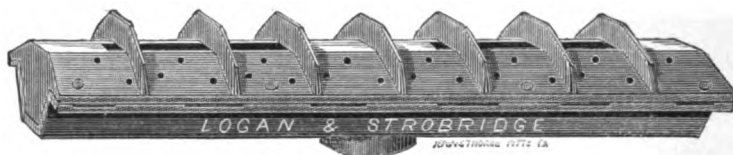
"OHIO" ROUND.

FIGURE 1050 A



NATURAL GAS FUEL BURNERS.

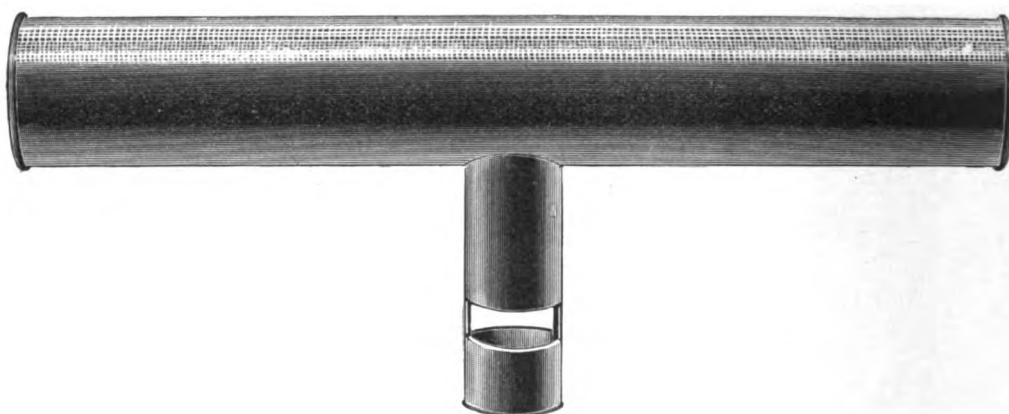
D. PATTERN.
CENTER INFLOW.
FIGURE 1050 B.



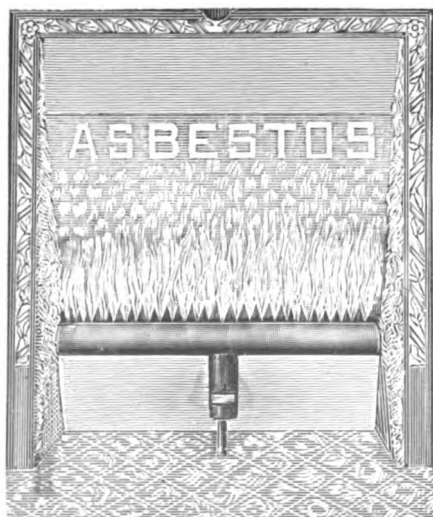
D. PATTERN.
END INFLOW.
FIGURE 1050 C.



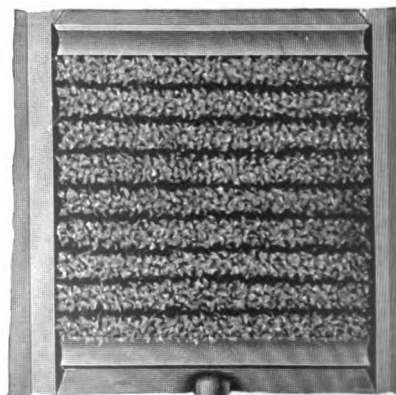
SHEET IRON CYLINDER BURNER.
FIGURE 1051.



SHEET IRON BURNER
WITH ASBESTOS BACK.
FIGURE 1051 A.



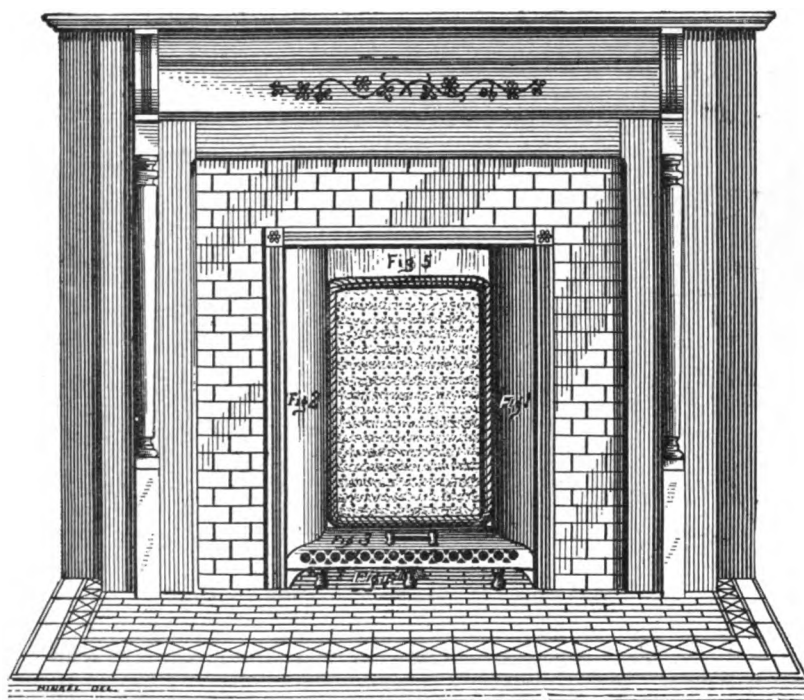
"ROYAL" ASBESTOS BACK WALL
AND BURNER COMBINED.
FIGURE 1051 B.



TAYLOR'S PATENT OPEN GRATE GAS BURNER.

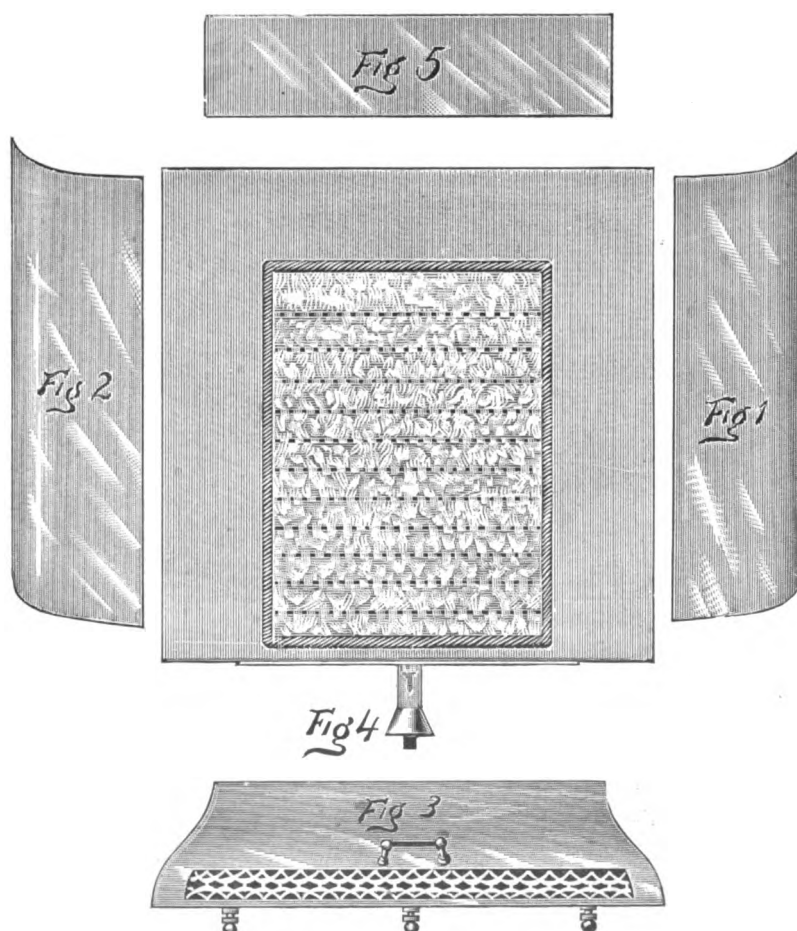
READY FOR USE.

FIGURE 1051 C.



DETAIL.

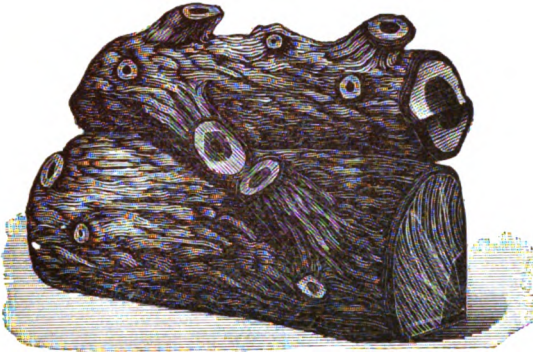
FIGURE 1051 D.



GAS LOGS, &c.

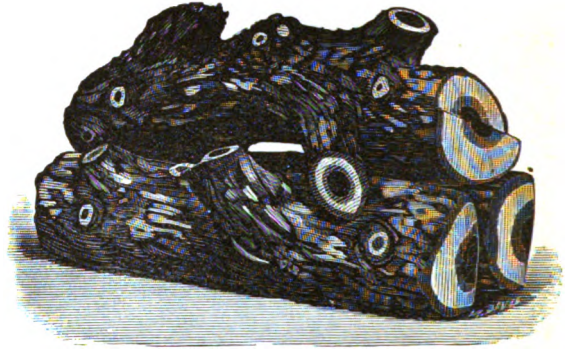
16 TO 24 INCHES LONG, 8 INCHES DEEP.

FIGURE 1051 G.



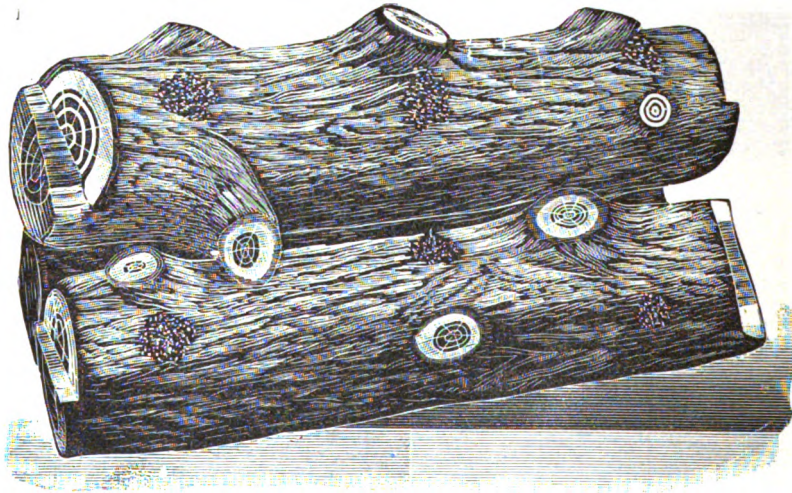
18 TO 24 INCHES LONG, 12 INCHES DEEP.

FIGURE 1051 H.



20 TO 44 INCHES LONG, 12 INCHES DEEP.

FIGURE 1051 I.



MERRILL'S HIGH POWER FURNACE BURNER.

FOR NATURAL GAS.

SECTION.

FIGURE 1051 M.

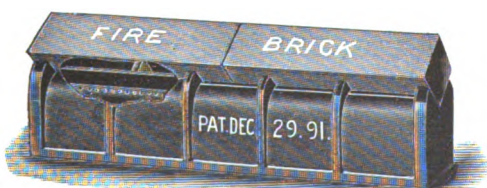


FIGURE 1051 N.



POLISHED BRASS FRONTS

FOR GAS FIRES.

FIGURE 1052.

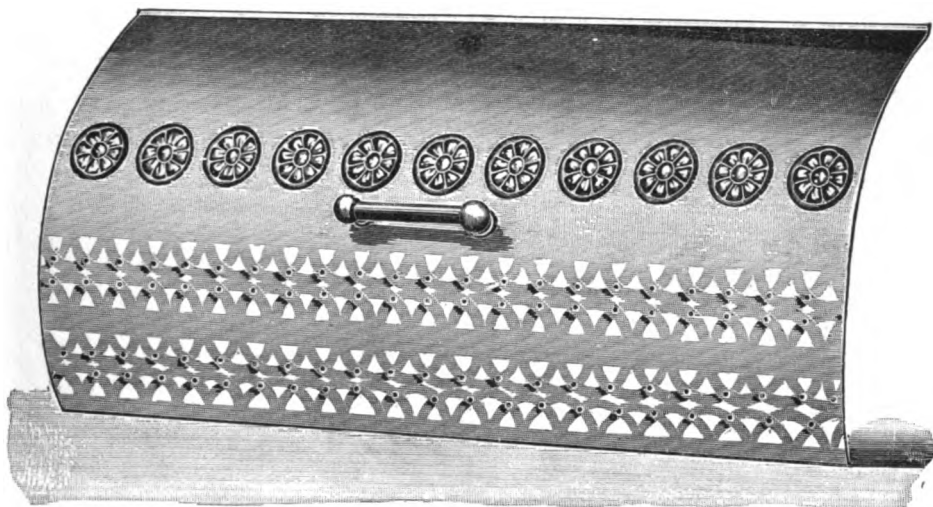


FIGURE 1052 A.

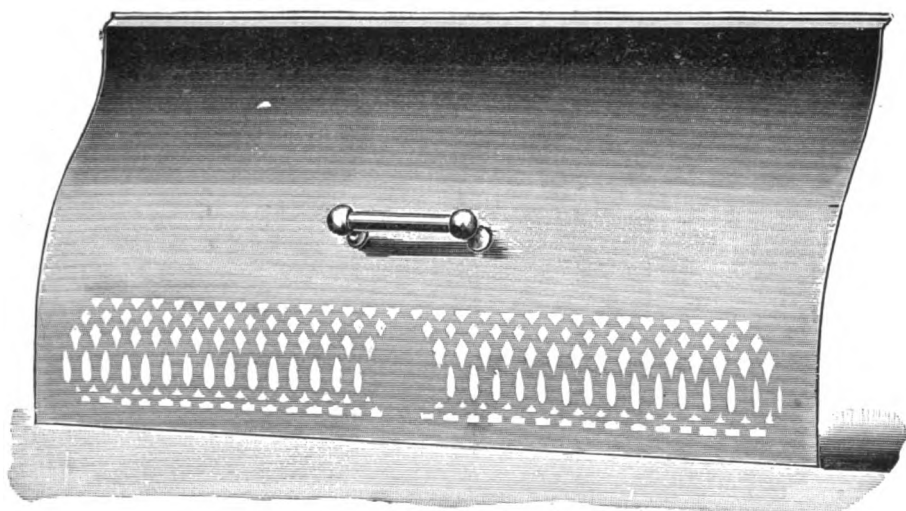
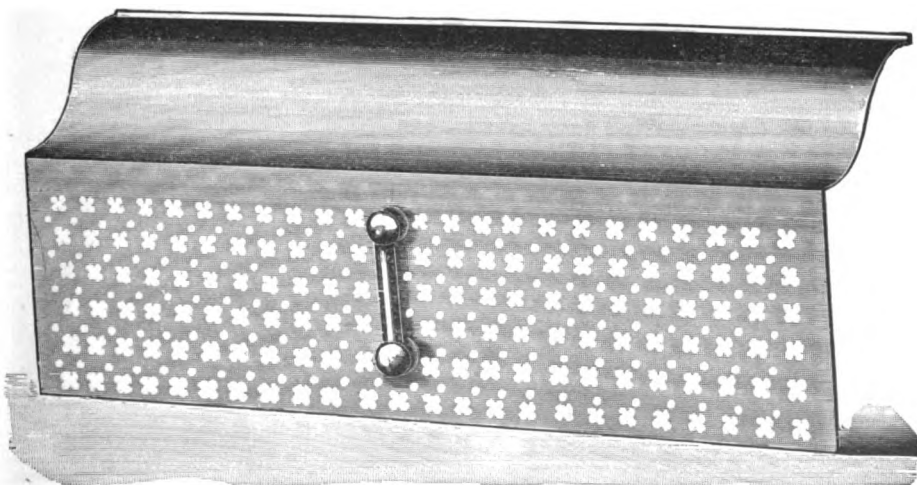


FIGURE 1052 B.

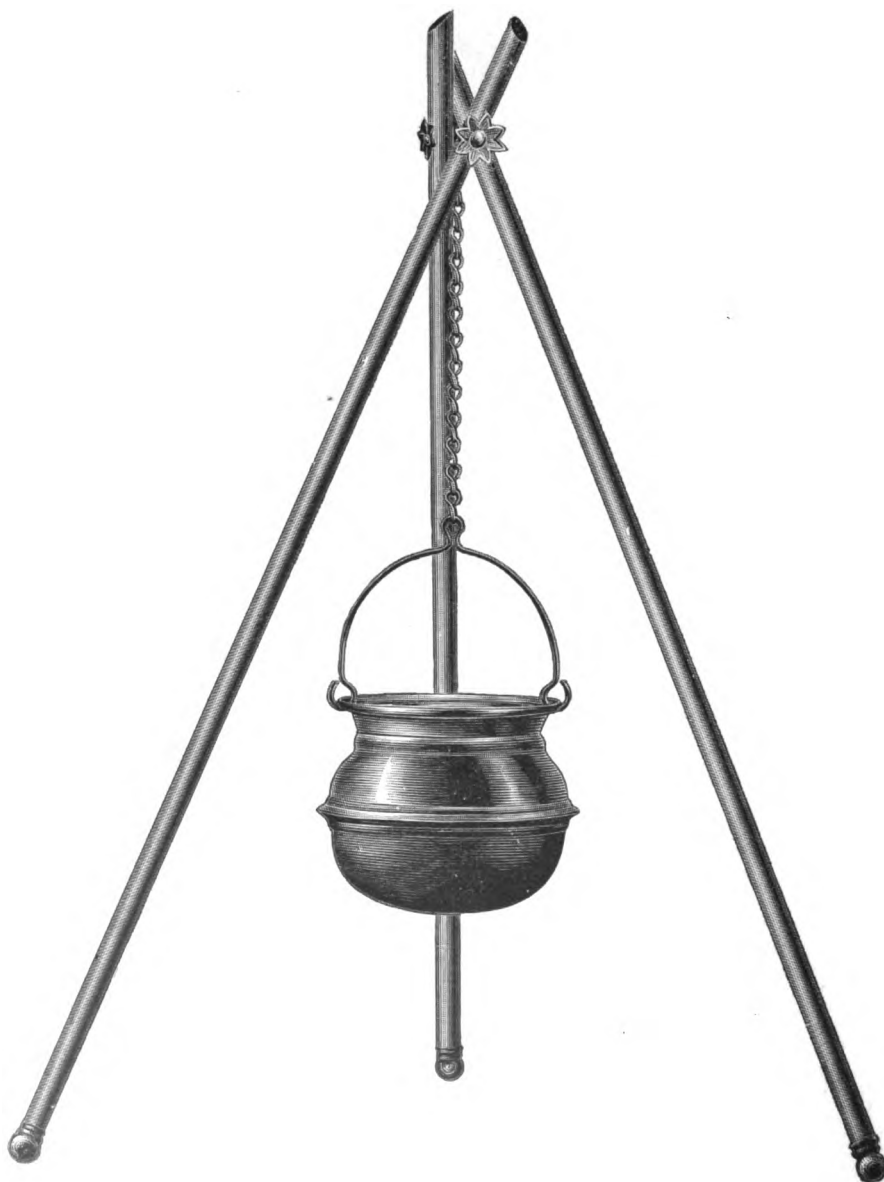


WATER EVAPORATOR.

FOR HANGING IN FRONT OF NATURAL GAS FIRE TO MOISTEN THE AIR.

POLISHED BRASS.

FIGURE 1052 E.



WATER EVAPORATORS, &c.

MADE FROM PREPARED CLAY.

ROUND.

FIGURE 1052 F.



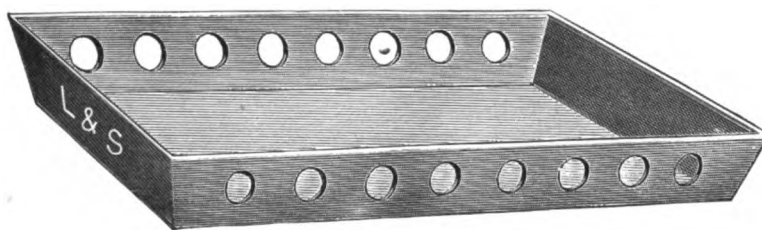
STRAIGHT.

FIGURE 1052 G.

**GARBAGE BURNERS.**

RECTANGULAR.

FIGURE 1052 H.



ROUND.

FIGURE 1052 I.



GAS HEATING STOVES AND RADIATOR.

THE "SPARKLE" GAS HEATER.

FIGURE 1053.



Height 14 inches.
Diameter 6½ inches.
Consumes 10 feet Gas per hour.

THE "LEADER" GAS HEATER.

FIGURE 1053 A.



Height 22 inches.
Diameter 7 inches.
Consumes 15 feet Gas per hour.

These Heaters are not connected with a flue. Connected by a rubber tube to gas fixture.

THE "PERFECTION" HEATER.

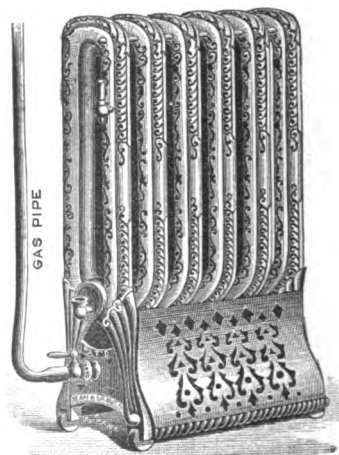
FIGURE 1053 B.



31 inches High—16½ inches Wide—14 inches Deep.
Consumes 24 feet Gas per hour.
Should be connected with a flue.

"ARDENT" GAS STEAM RADIATOR.

FIGURE 1053 C.



Fill Radiator partly full of water, light the gas. The water will soon be turned into steam which circulates through the Radiator. Gas can be connected by a rubber tube to any gas fixture. Radiator, being on castors, can be moved as desired.

GAS HEATING STOVES, RADIATOR, &c.

"SIMPLEX" GAS STOVE AND
RADIATOR,
FIGURE 1053 E.

"SIMPLEX" GAS STOVE.

FIGURE 1053 D.



Size $10\frac{1}{2} \times 14\frac{1}{2}$ Inches.

Gas Consumed 8 to 10 feet per hour.
Should be connected with flue.



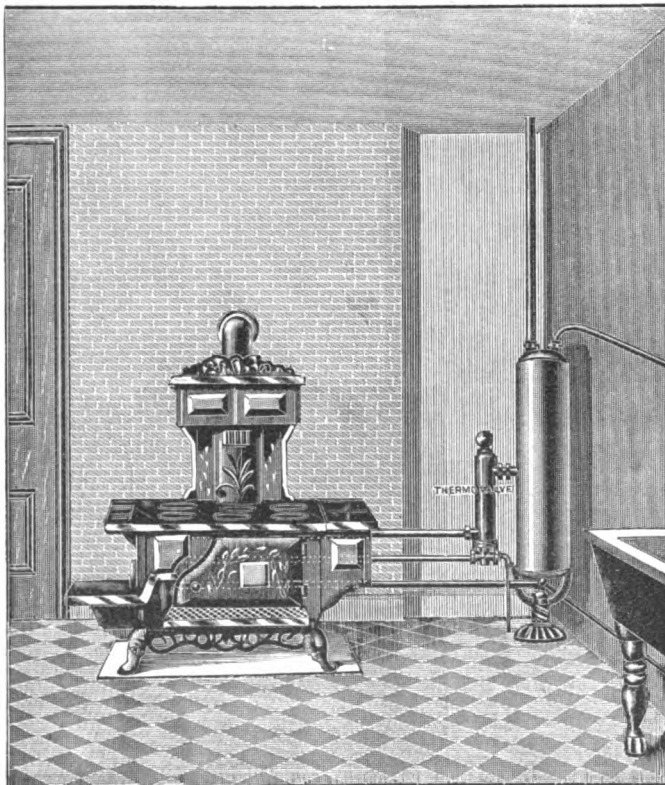
Size 12 x 22 inches.

Gas Consumed 10 feet per hour.
Should be connected with flue.

MERRILL'S THERMO REGULATOR.

FOR HOT WATER BOILER.

FIGURE 1053 M.



The flow of gas is automatically controlled by the temperature of the water, thus keeping the water at an even temperature.

ILLUMINATING BURNERS For Natural or Artificial Gas.

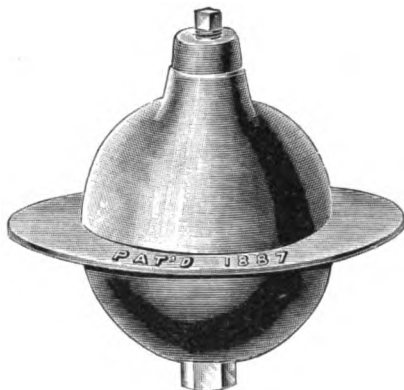
TODD'S PATENT.

FIGURE 1055.



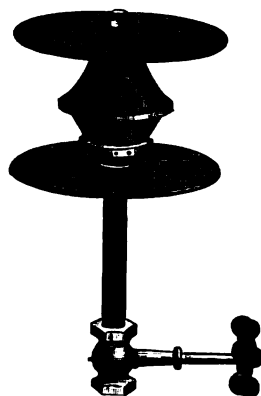
"PARAGON."

FIGURE 1055 A.



"STORM."

FIGURE 1055 B.



"VICTOR"

FIGURE 1055 C.

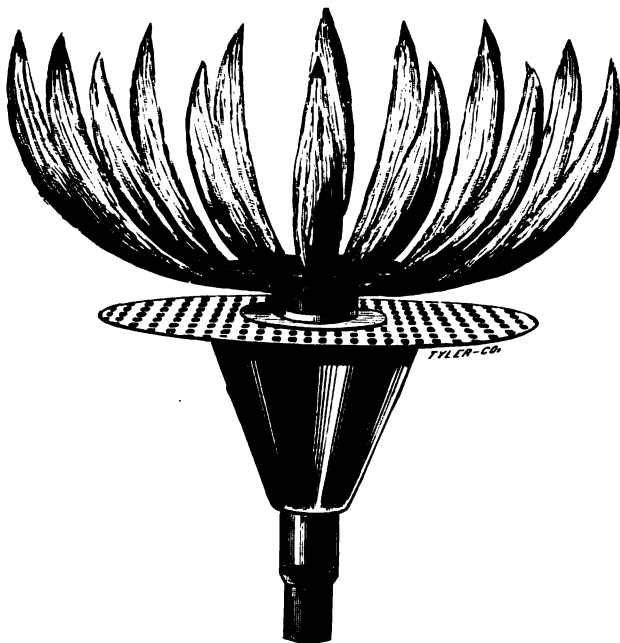
"MONITOR" HEATING
BURNER.

FIGURE 1055 D.



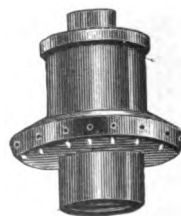
"SUN."

FIGURE 1055 E.



IRWIN'S PATENT HOUSE.

FIGURE 1055 F.



ILLUMINATING BURNERS—Continued.

"COMMON" ARGAND.

FIGURE 1056.



"NIAGARA" ARGAND.

FIGURE 1056 B.

LANGREN'S PATENT REGENERATIVE
GAS LAMP.

FIGURE 1056 D.



Majolica Chimney, Nickel or Antique Brass Trimmings.

TODD'S PATENT ARGAND.

FIGURE 1056 A.

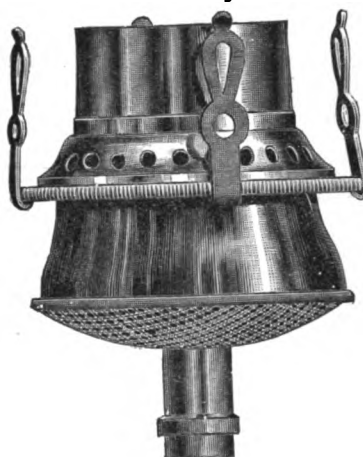
"NIAGARA"—WITH TRIPOD, CHIMNEY
AND SHADE.

FIGURE 1056 C.

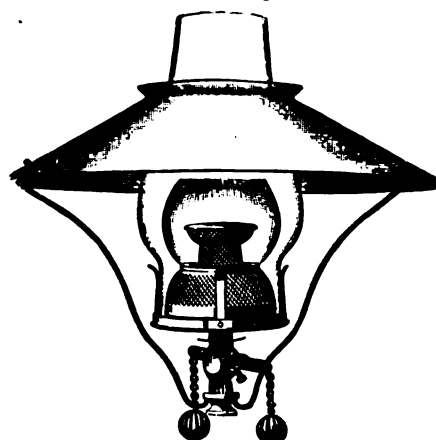
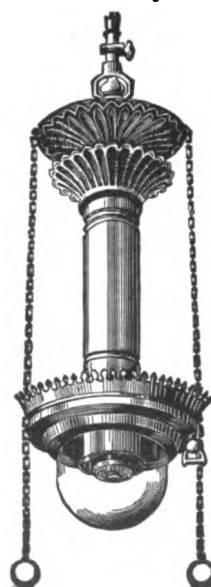
LANGREN'S PATENT REGENERATIVE
GAS LAMP.

FIGURE 1056 E.



Nickel Plated Body, Trimmings and Canopy.

ILLUMINATING BURNERS—Continued.

JUMBO.
FIGURE 1057.BRAY'S SPECIAL.
FIGURE 1057 A.BURNER BASE
OR CHECK FOR
BRAY'S SPECIAL.
FIGURE 1057 B.

To regulate the flow of Gas.

MACKLEY'S PATENT.
FIGURE 1058.

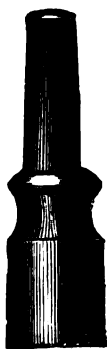
GAS BURNERS.

FIGURE 1059.



Brass.

FIGURE 1059 A.



Iron.

GASOLINE BURNER.

FIGURE 1059 B.

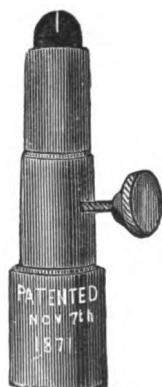


FIGURE 1059 E.



Brass.

FIGURE 1059 F.



Iron.

LAVA TIPS.

FIGURE 1059 L.



A.

FIGURE 1059 M.



E.

FIGURE 1059 N.



EH.

FIGURE 1059 R.



Bat Wing.

FIGURE 1059 S.



Fish Tail.

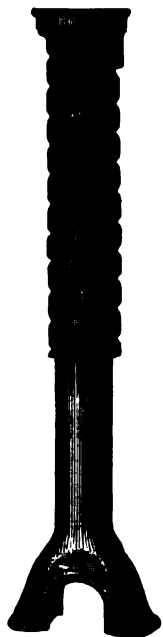
SCOTCH TIPS.

EXTENSION SHUT-OFF BOXES.

FOR STOP COCKS.

COMPLETE.

FIGURE 1060.



EXTENSION PIECE.

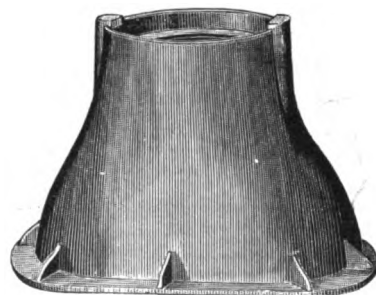
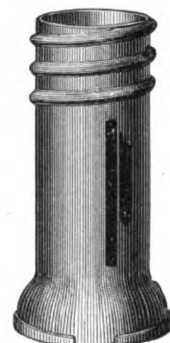
FIGURE 1060 A.



FOR VALVES.

COMPLETE.

FIGURE 1061.



COVERS FOR STOP COCK BOXES.

FIGURE 1060 B.



FIGURE 1060 C.



KEY.

FIGURE 1061 A.



COVERS FOR VALVE BOXES.

FIGURE 1061 B.



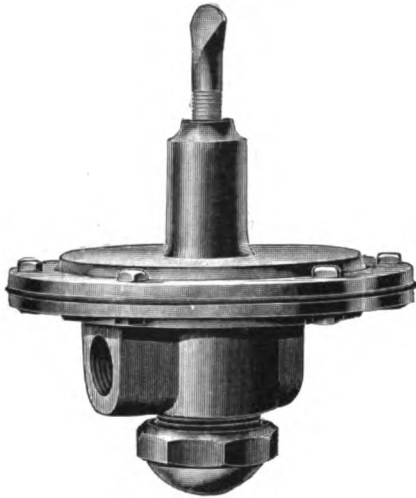
FIGURE 1061 C.



NATURAL GAS REGULATORS.

DARLING'S PATENT HOUSE REGULATOR.

FIGURE 1063.



Used in connection with house or small service lines, where the supply is direct from the Mains.

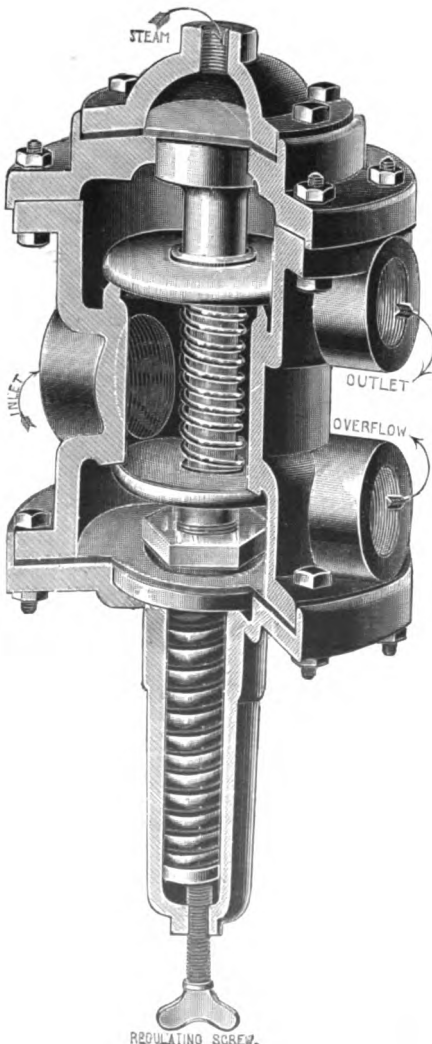
The pressure on such lines is never uniform and regulation is essential for safety.

The DARLING REGULATOR maintains a uniform pressure at all times and under all circumstances.

The Screw at the top can be adjusted so as to give any desired pressure. Made in one size, 1 inch by 1 inch.

DARLING'S PATENT BOILER REGULATOR.

FIGURE 1064.



DIRECTIONS FOR MAKING CONNECTIONS.

Blow all scales and dirt out of high pressure gas line and connect it to "Inlet."

Connect to furnace from "Outlet."

Connect steam to top marked "Steam."

1st. Turn on high pressure gas and steam.

2d. Turn up the Regulating Screw gradually.

3d. Keep adjusting the Regulating Screw until the required amount of steam is obtained.

The Overflow may be plugged, or the surplus gas may be allowed to escape or may be conducted into a line and led to some other point.

No other Regulator makes any provision for using surplus gas.

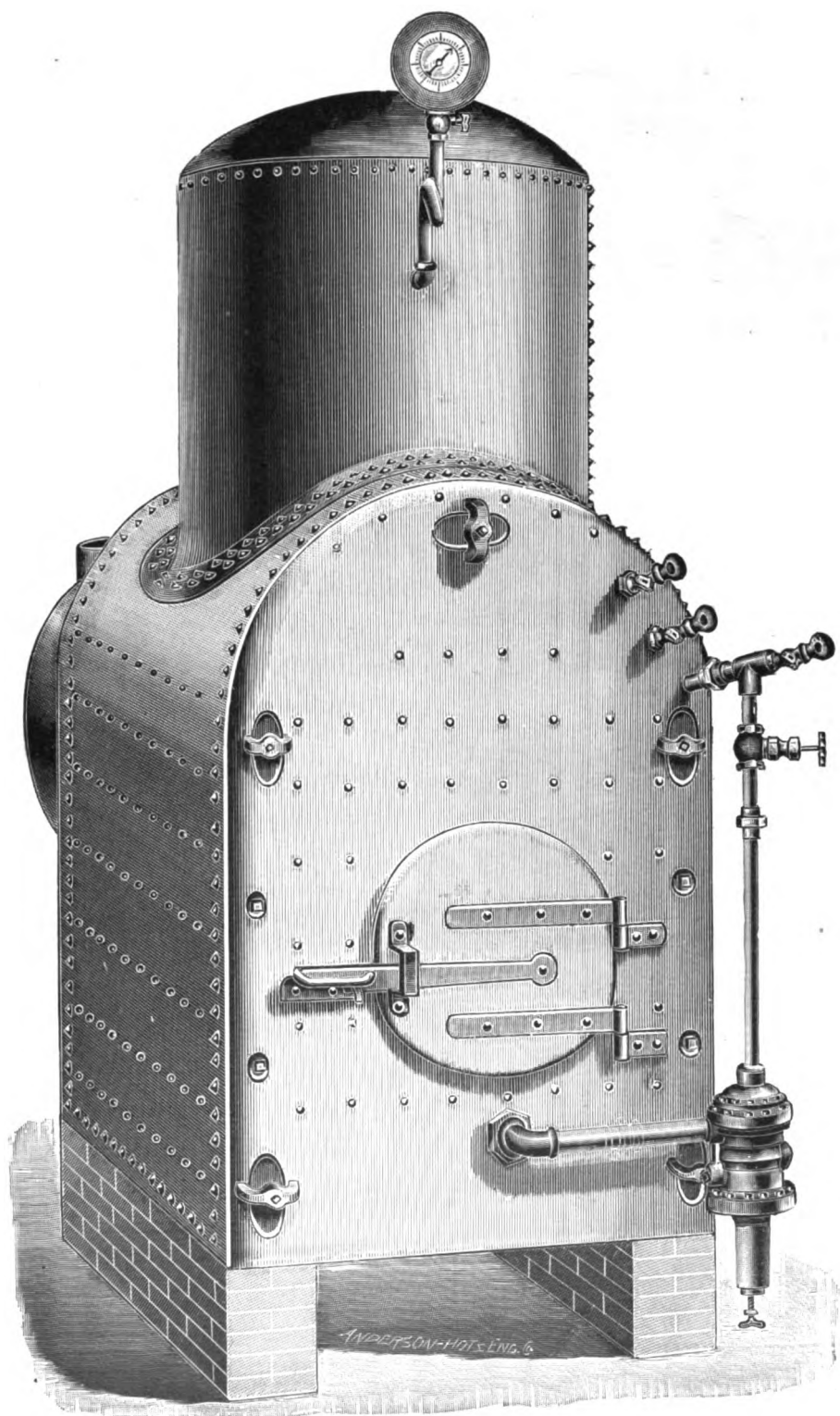
This Regulator can be used to reduce the pressure of Gas, without the use of steam.

In such cases the opening marked "Steam" should be plugged.

Made in two sizes: 1 inch by 1 inch—1½ inches by 2 inches.

NATURAL GAS REGULATOR.

FIGURE 1064 A.



Darling's Patent Regulator as applied to Steam Boiler.

NATURAL GAS REGULATORS.

FOR CONTROLLING THE PRESSURE AND REGULATING THE FLOW OF NATURAL GAS.

UNION WATER METER CO.'S UNION PRESSURE REGULATOR.

FIGURE 1065.

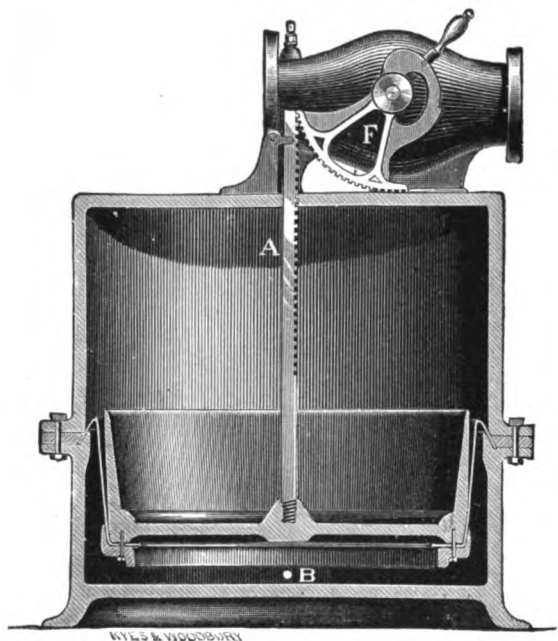


FIGURE 1066.

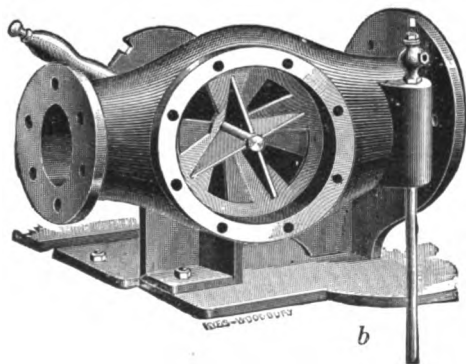


FIGURE 1066 A.



These Regulators not only reduce the pressure, but also regulate the flow. They are neat and compact. A Piston with rolling diaphragm operates a rotary valve with V shaped ports, thus giving a very long stroke and graduating the flow of gas with entire accuracy. Attention is called to the conical shape of the valve, which admits of its being made perfectly gas tight, prevents its being affected by contraction or expansion, or any changes of temperature, and dispenses with packing around the valve stem. The cutting edges of the ports will shear off ice or any foreign matter on the seats. Once properly set they will regulate the gas to the exact amount required.

Figure 1065 is a sectional view of the tank and piston, connected to the valve by rack and segment.

Figure 1066 shows the valve with cap removed.

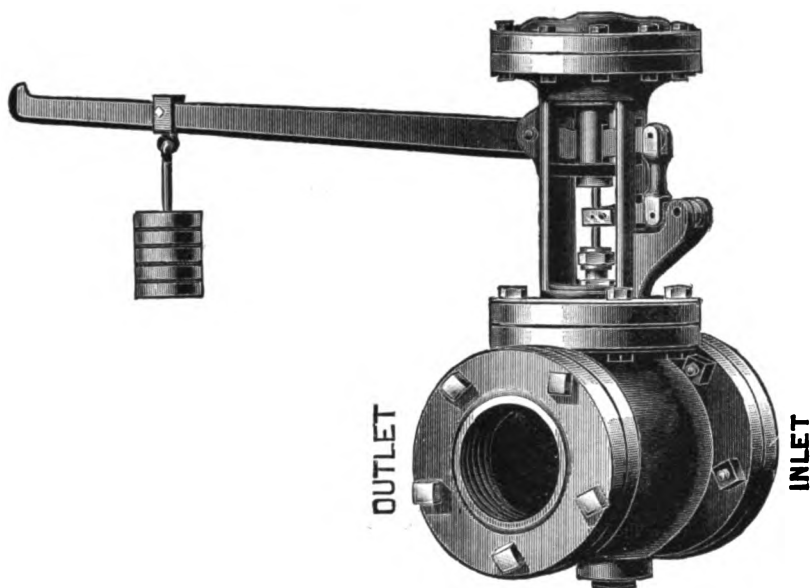
Figure 1066 A shows the valve.

Gas is taken from low pressure side by pipe *b* to underside of piston at B. Any increase of pressure raises the piston and by means of rack A and segment F closes the valve, diminishing the supply. Any decrease of pressure opens the valve, increases the supply and raises the pressure.

NATURAL GAS REGULATORS.

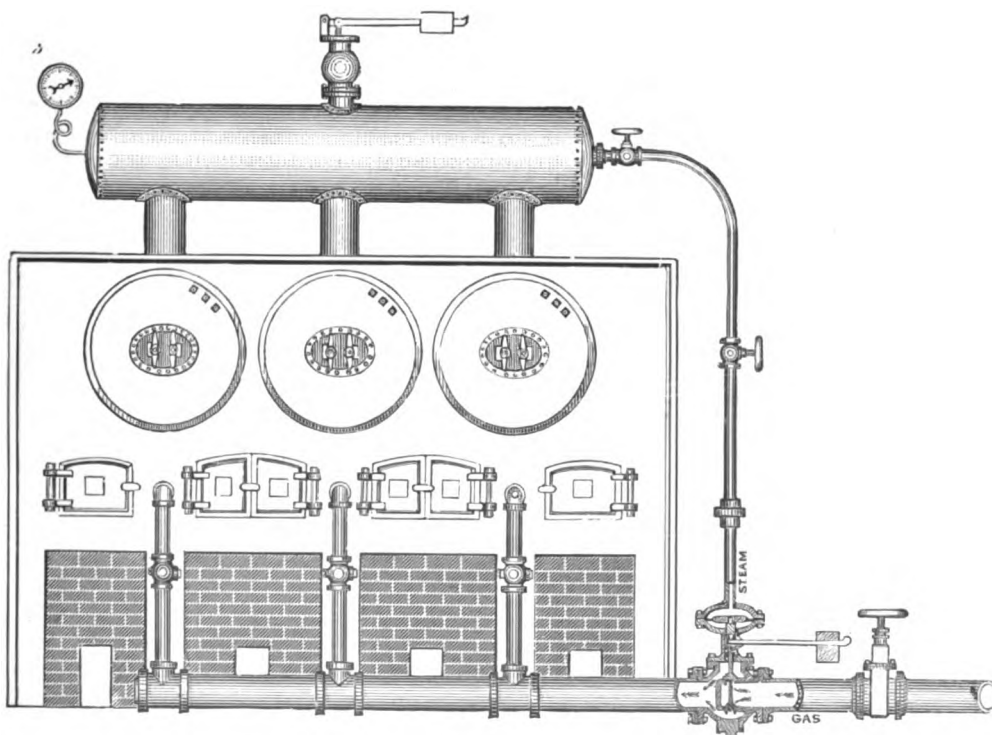
FULTON'S PATENT
REGULATOR FOR STEAM BOILERS.

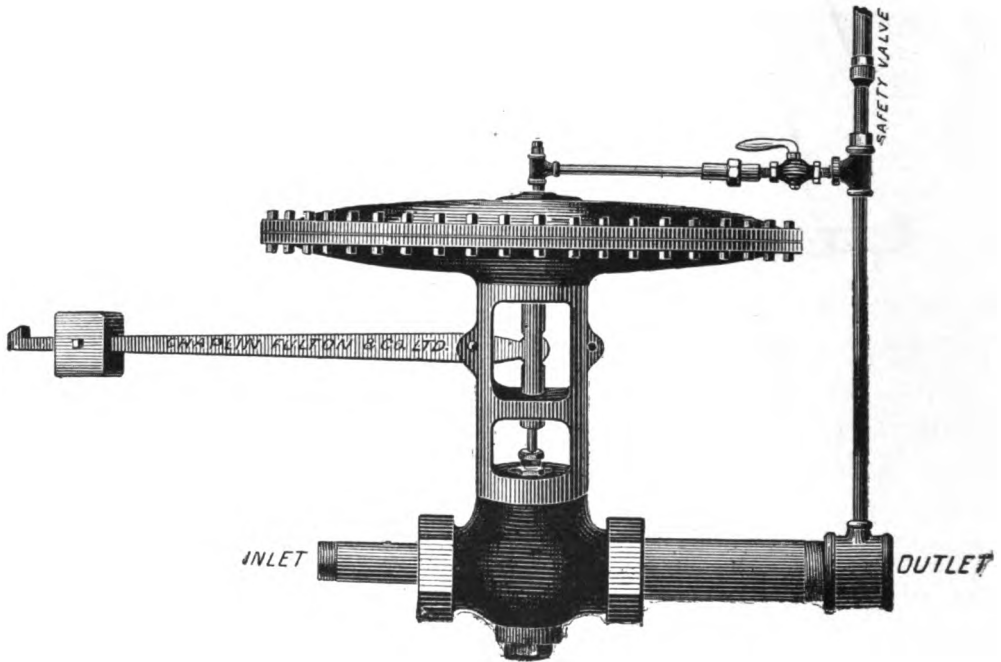
FIGURE 1070.



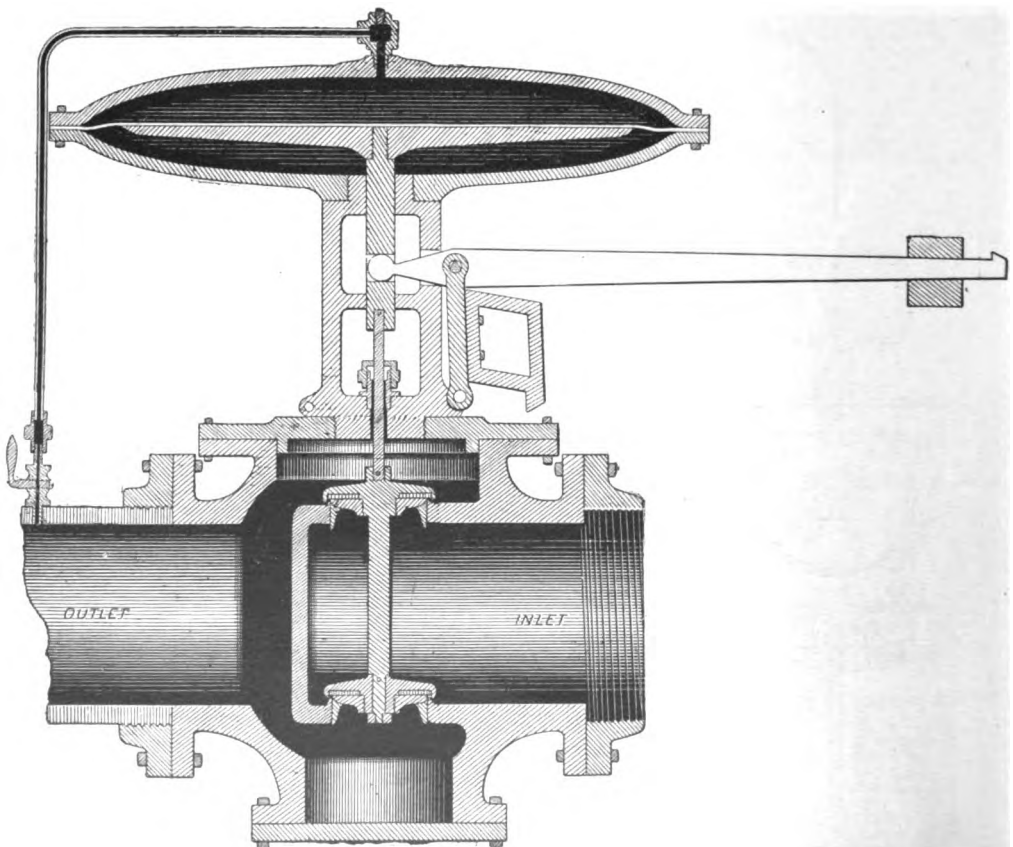
CONNECTED TO BOILER.

FIGURE 1070 A.



NATURAL GAS REGULATORS.**FULTON'S LOW PRESSURE REGULATORS WITH AUTOMATIC CUT-OFF ATTACHMENT.****FIGURE 1073.**

Small size for House and Country Lines.

FIGURE 1073 A.

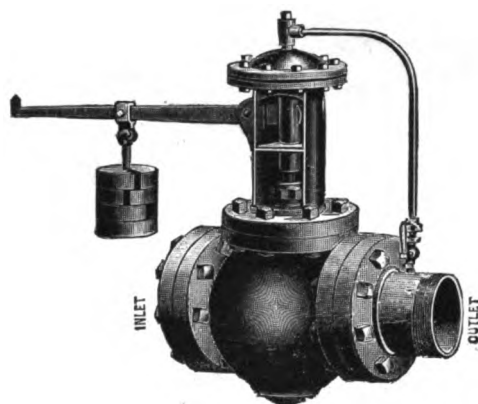
Large size for City and Town Low Service Systems.

NATURAL GAS REGULATORS.

FULTON'S HIGH PRESSURE REGULATORS.

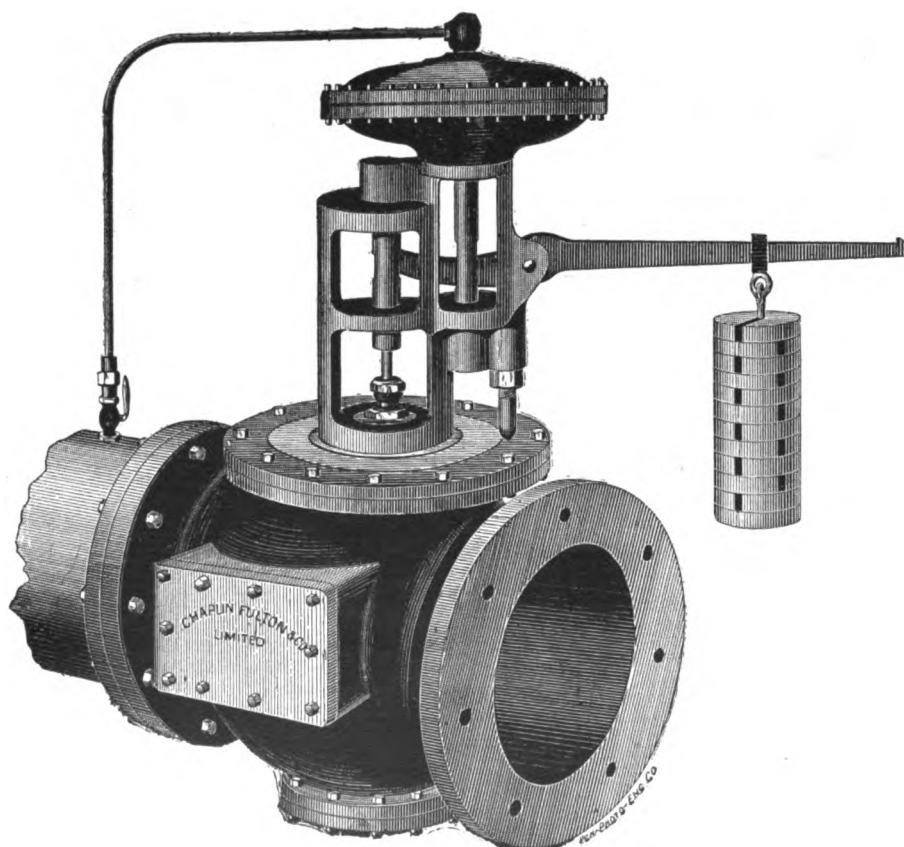
SMALL SIZE WITH SIMPLE LEVER.

FIGURE 1073 D.



LARGE SIZE WITH COMPOUND LEVER.

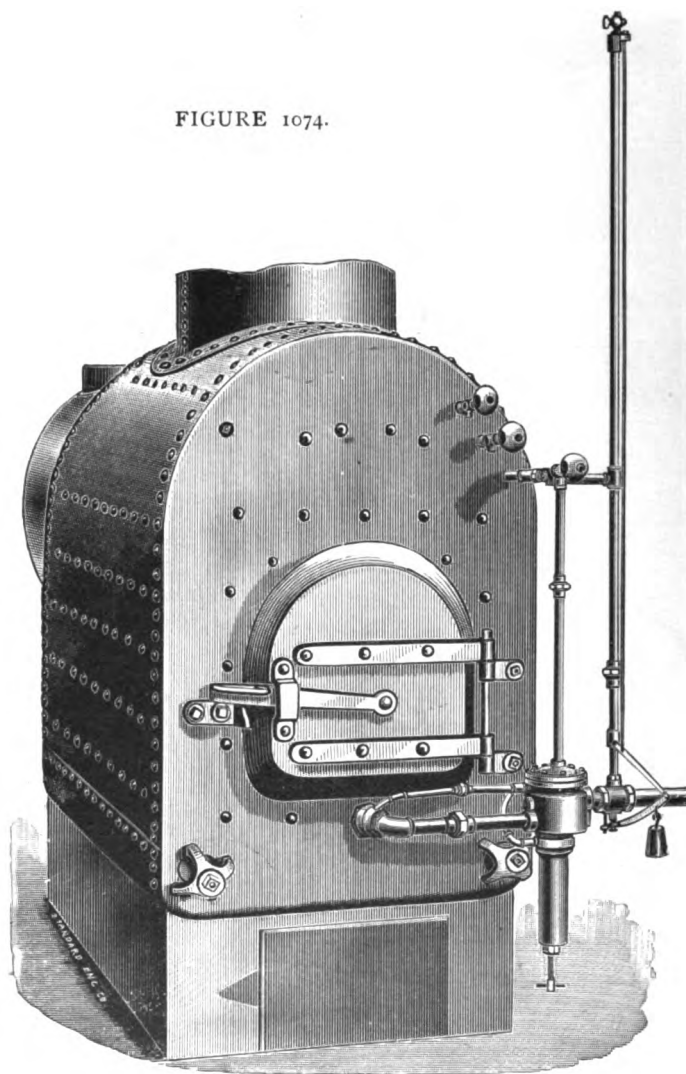
FIGURE 1073 E.



NATURAL GAS REGULATOR.

LUTHER'S PATENT BOILER REGULATOR AND LOW WATER SHUT-OFF.

FIGURE 1074.

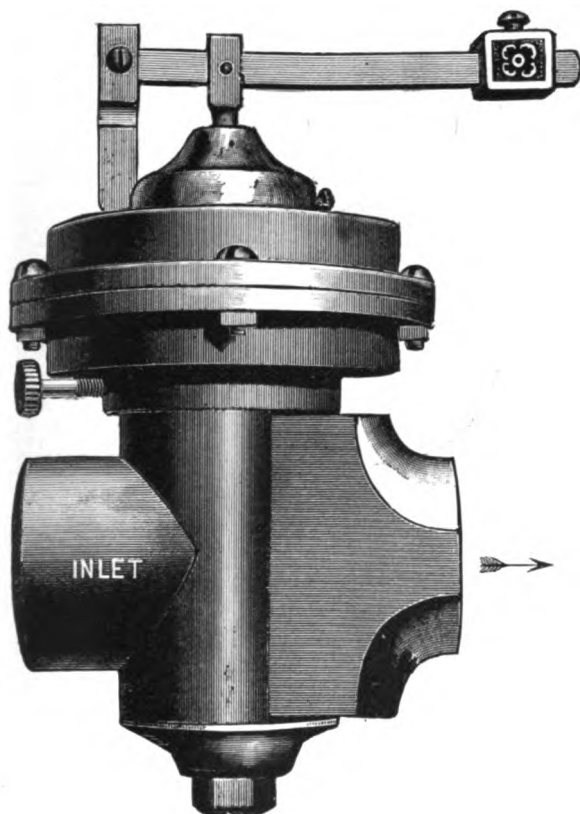


The Low Water Shut-Off can be used with or without the Regulator. The gas will be shut-off when the water goes below the water gauge to which it is connected, thus preventing burning of the boiler.

In ordering, give the gas pressure.

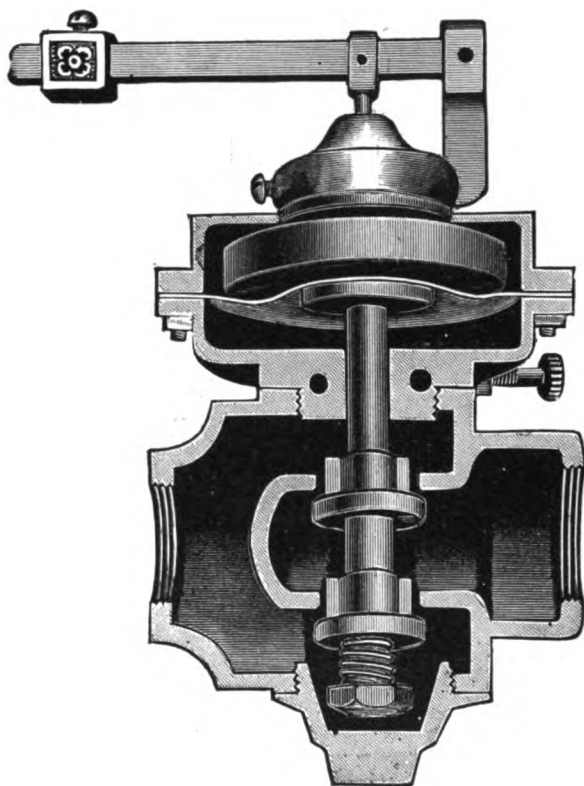
NATURAL GAS REGULATORS.

LUTHER'S PATENT LOW PRESSURE REGULATORS.

COMPLETE.
FIGURE 1075.

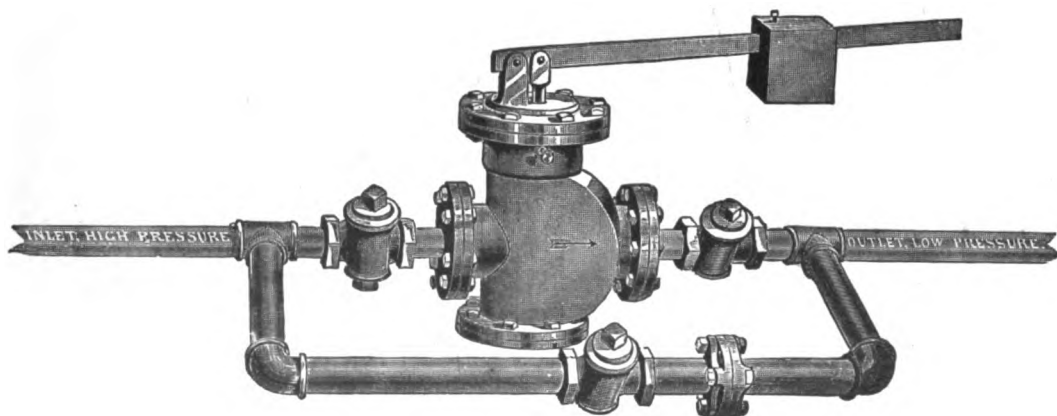
SECTION.

FIGURE 1076.



LUTHER'S PATENT HIGH PRESSURE REGULATOR.

FIGURE 1077.



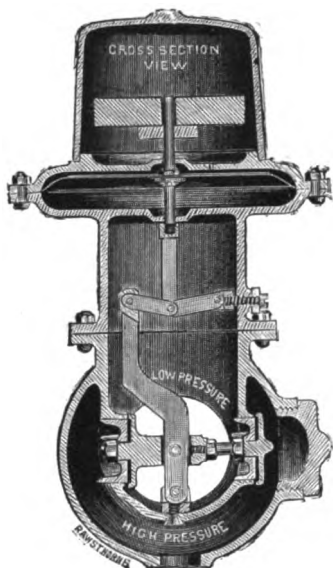
Showing Regulator connected with Bypass.

NATURAL GAS REGULATORS.

MERRILL'S PATENT LOW PRESSURE REGULATORS.

"STREET."

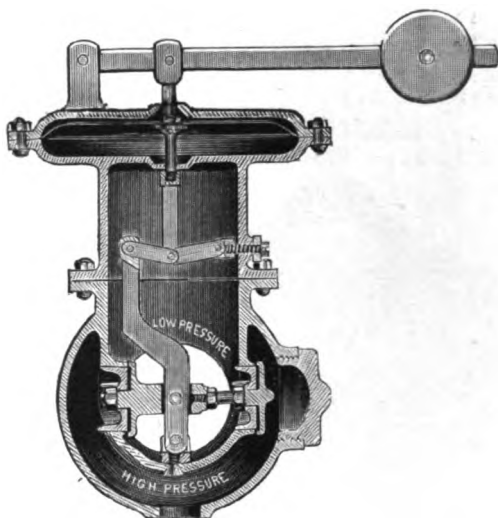
FIGURE 1079.



For delivery pressure from 3 to 10 ounces.

"MILL."

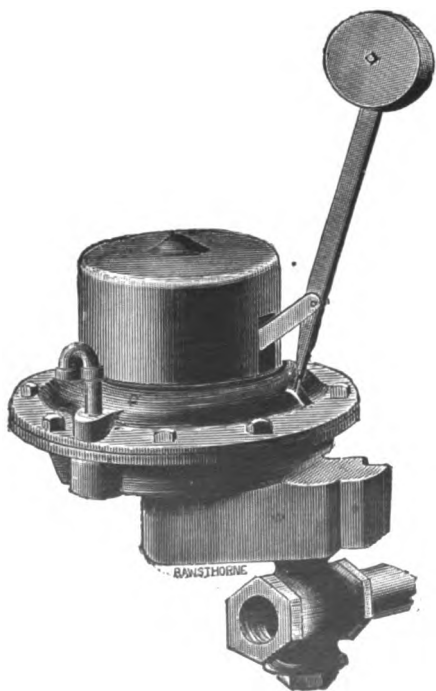
FIGURE 1079 A.



For delivery pressure from 8 ozs. to 3 pounds.

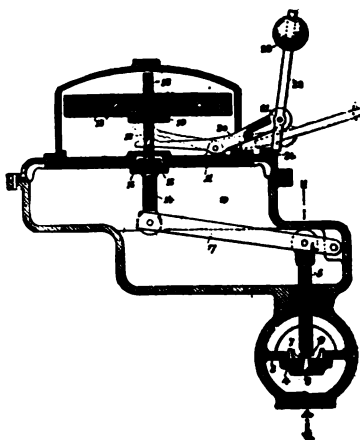
HOUSE REGULATOR,
WITH CUT-OFF VALVE.

FIGURE 1079 B.



SECTION.

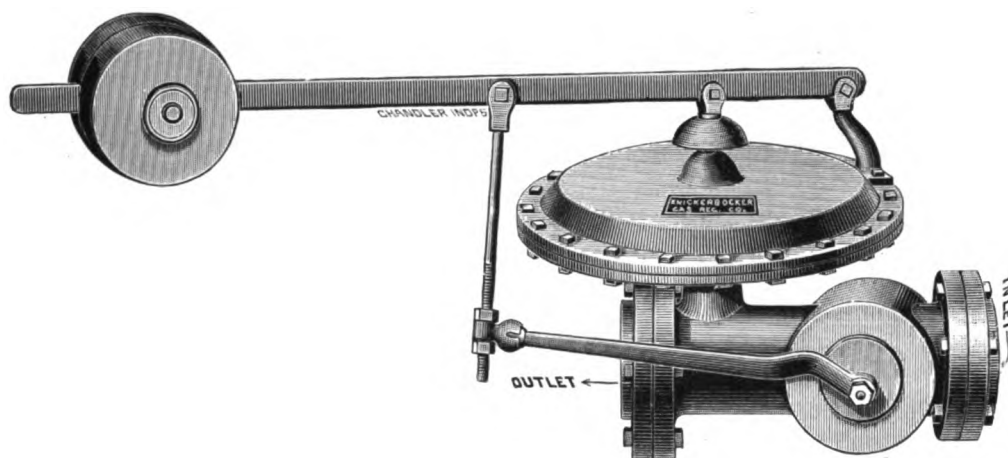
FIGURE 1079 C.



NATURAL GAS REGULATORS.

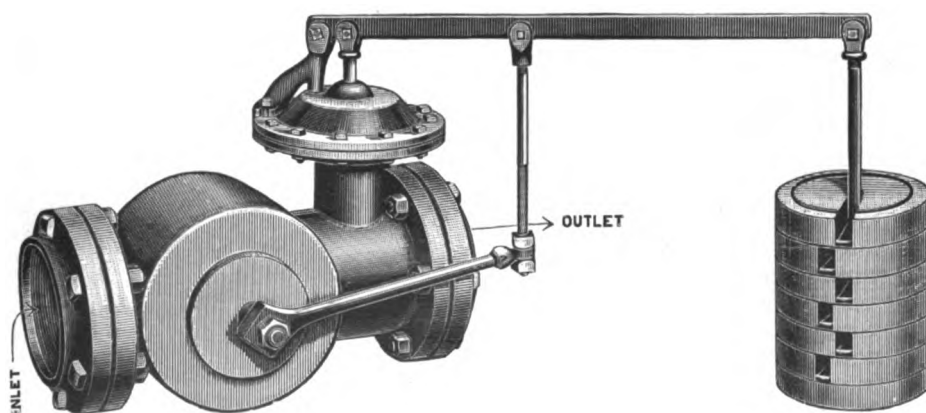
KNICKERBOCKER LOW PRESSURE REGULATOR.

FIGURE 1080.



KNICKERBOCKER HIGH PRESSURE REGULATOR.

FIGURE 1080 A.

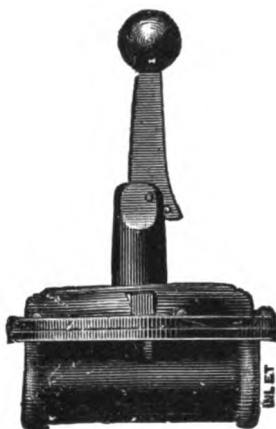


SHUT-OFF AND REGULATING VALVES.

HAZLET & BEMAN'S AUTOMATIC GAS SHUT-OFF.

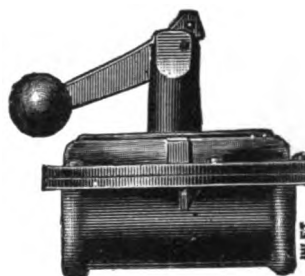
OPEN.

FIGURE 1081.



CLOSED.

FIGURE 1081 A.



Set the Valve as near level as will allow the Ball Lever to fall with its own gravity. When the ball is upright the gas is on full force ; when down the valve is closed.

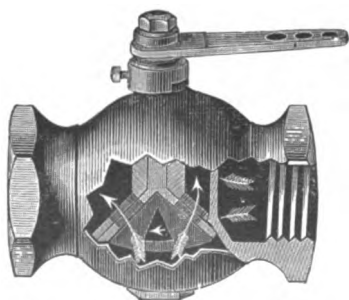
CHRONOMETER GOVERNOR AND REGULATING VALVES.

FITT'S PATENT.

WITHOUT YOKE.

FIGURE 1082.

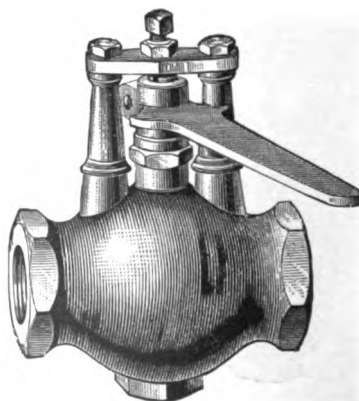
(Formerly 699.)



WITH YOKE.

FIGURE 1082 A.

(Formerly 698.)

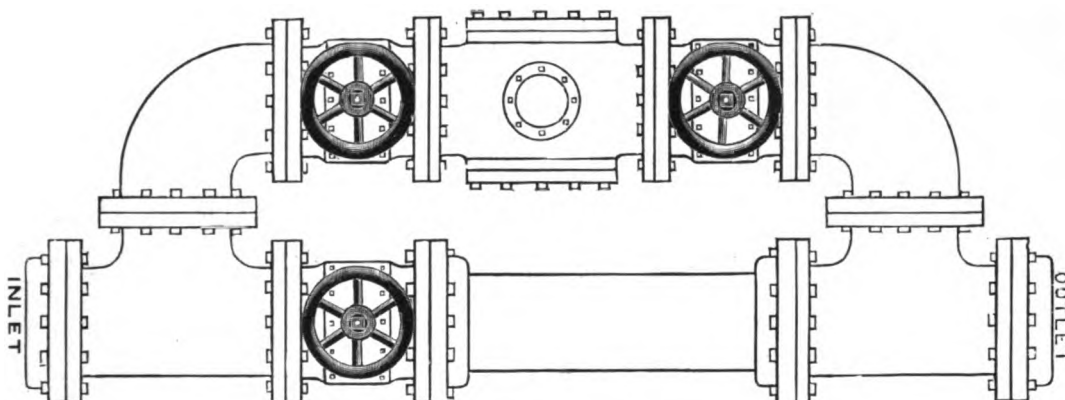


NATURAL GAS REGULATING STATIONS.

"GROUND PLAN"

SINGLE REGULATOR STATION, WITH BYPASS, FOR HIGH PRESSURE GAS.

FIGURE 1084.

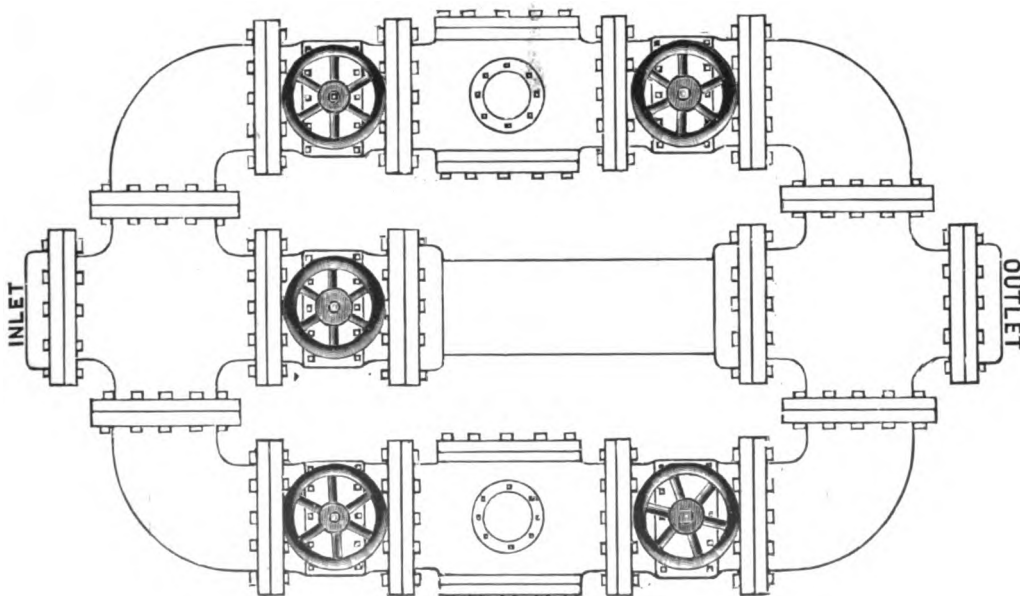


Inlet and outlet same size.

"GROUND PLAN"

DOUBLE REGULATOR STATION, WITH BYPASS, FOR HIGH PRESSURE GAS.

FIGURE 1084 A.



Inlet and outlet same size.

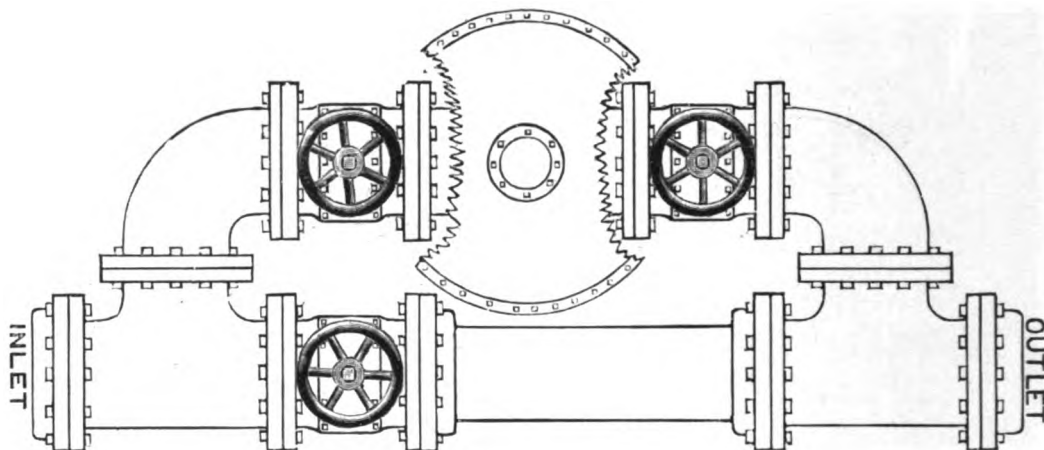
In ordering a Regulating Station, state the service for which Regulators will probably be required, and give initial and delivery pressures.

NATURAL GAS REGULATING STATIONS.

"GROUND PLAN"

REGULATING STATION, WITH BYPASS, FOR LOW PRESSURE GAS.

FIGURE 1084 B.

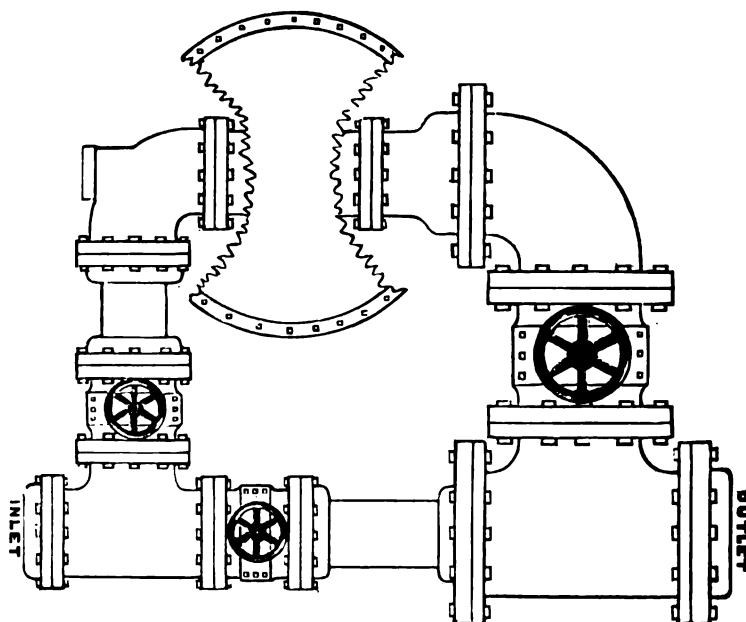


Inlet and outlet same size.

"GROUND PLAN."

REGULATING STATION, WITH BYPASS, FOR LOW PRESSURE GAS.

FIGURE 1084 C.

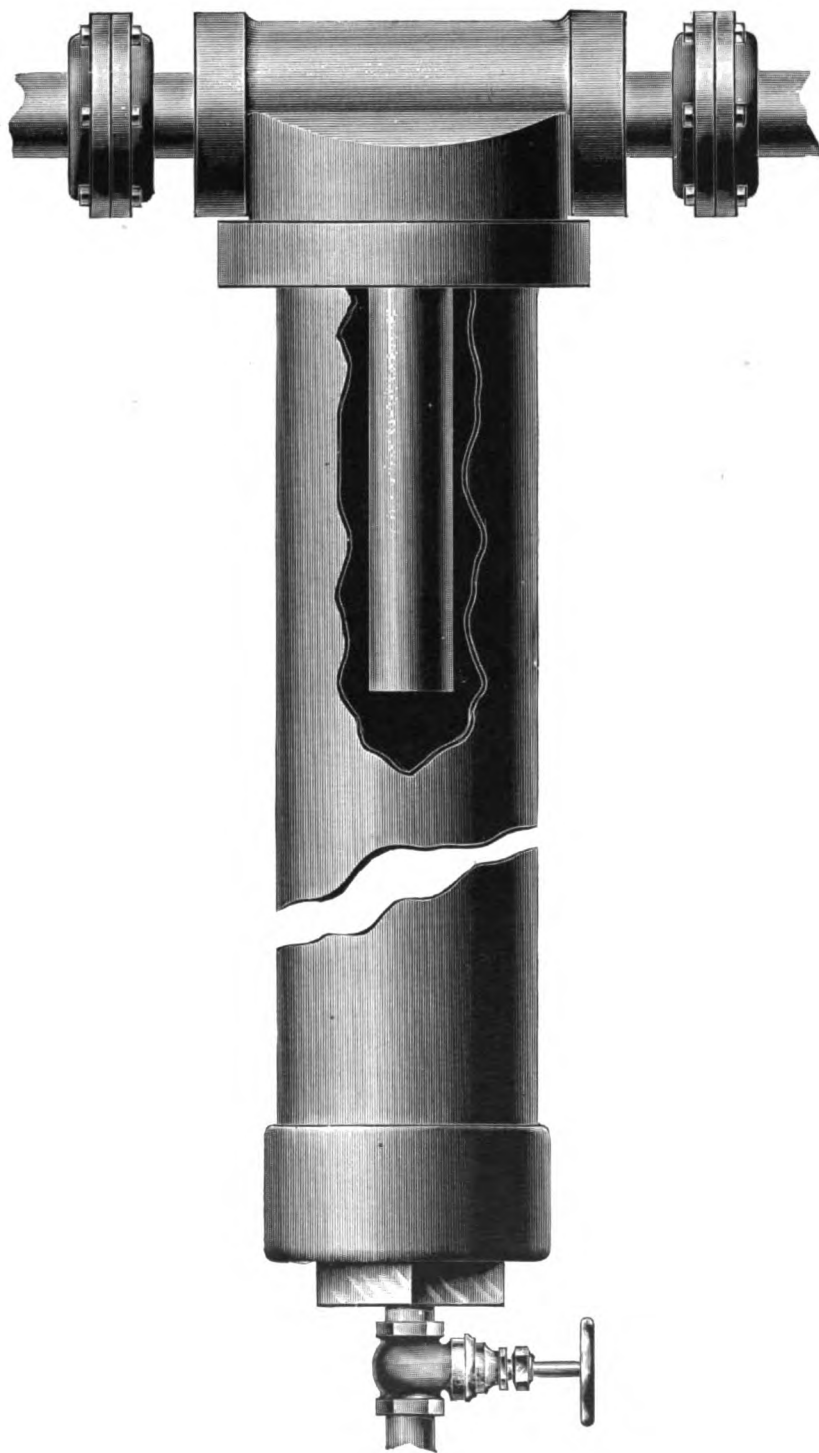


Small inlet, large outlet.

In ordering a Regulating Station, state the service for which Regulator will probably be required, and give initial and delivery pressures.

FLUID CATCHER OR DRIP FOR GAS WELLS.

FIGURE 1085.



A fluid Catcher or Drip. near the gas well, should always be used to prevent water or oil getting into the mains. It also prevents foreign substances reaching the Regulator.

NATURAL GAS METERS.

"KEYSTONE" METER.

FIGURE 1087.



"WESTINGHOUSE" METER.

FIGURE 1088.



BRASS MIXERS.

FOR MIXING AIR WITH NATURAL GAS FOR FUEL.

KITTANNING OR SHORT PATTERN

PLAIN,
WITH SOLID PIN.

FIGURE 1090.



SECTION.

FIGURE 1090.

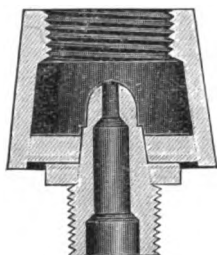
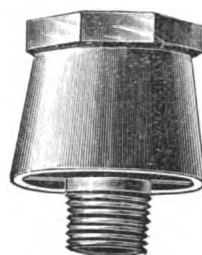
HEXAGON,
WITH SOLID PIN.

FIGURE 1091 A.



(Kittanning Mixers with Loose Pins can be furnished if required.)

ALLEGHENY OR LONG PATTERN.

WITH SOLID PIN.

FIGURE 1092.



WITH LOOSE PIN.

FIGURE 1093.



FIGURE 1093.

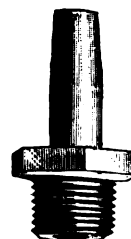
GLOBE,
WITH SOLID PIN.

FIGURE 1095.

GLOBE,
WITH LOOSE PIN AND SET SCREW.

FIGURE 1095 A.



BRASS MIXERS.

OPEN SIDE.

WITH SET SCREW.

FIGURE 1096.

ADJUSTABLE SHIELD,
TO REGULATE FLOW OF AIR.

FIGURE 1097.

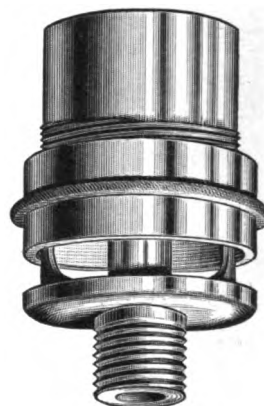
HALF GLOBE,
WITH LOOSE PIN AND SET SCREW.

FIGURE 1098.

COMBINATION MIXER
AND STOP COCK.

FIGURE 1098 B.



Wood Handle.

MIXERS.

IRON, WITH
ADJUSTABLE SHIELD.

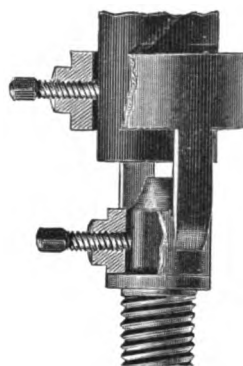
FIGURE 1100.



Large Size.

IRON,
CADMAN'S OPEN SIDE, WITH SET SCREWS.

FIGURE 1105.



TAYLOR'S PATENT, CONE MIXERS.

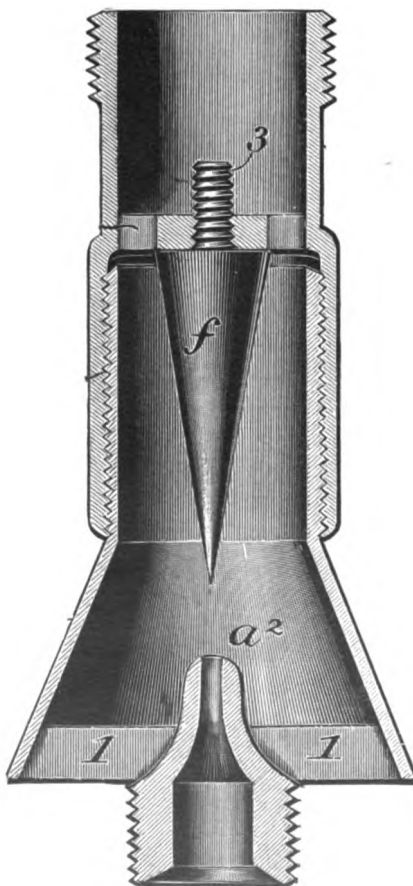
COMPLETE.

FIGURE 1110.



SECTION.

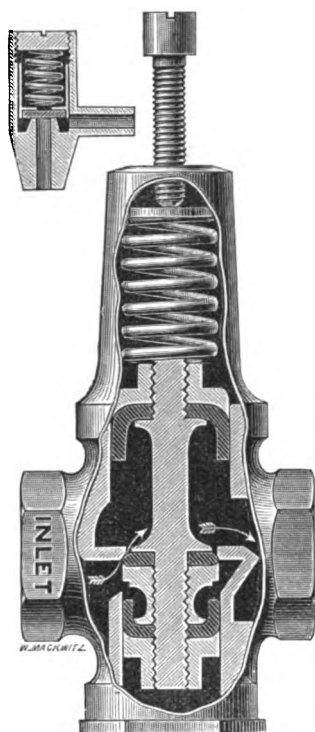
FIGURE 1110 A.



REGULATORS AND GOVERNOR.

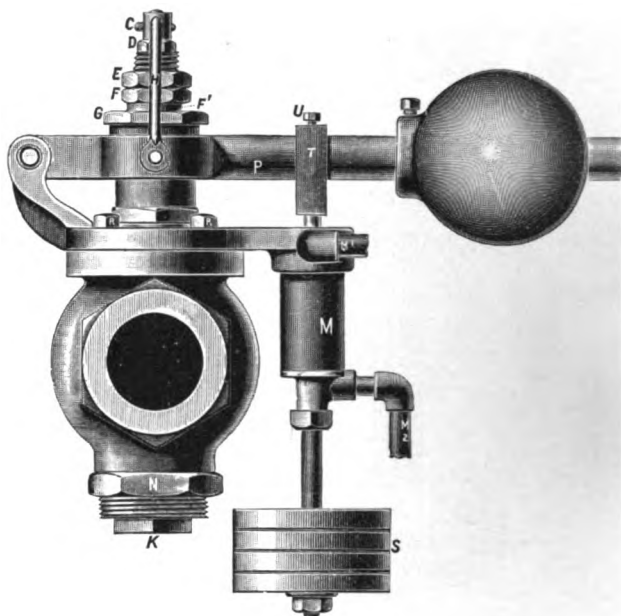
MUELLER'S WATER PRESSURE
REGULATOR.

FIGURE 1151.



FOSTER'S PATENT PUMP GOVERNOR.

FIGURE 1152.

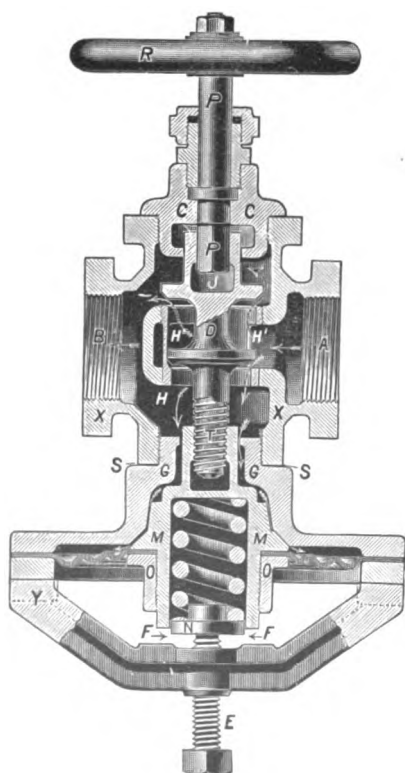


The Ball regulates the delivery of Steam—the Weights regulate the Discharge of Water.

FOSTER'S PATENT IMPROVED PRESSURE REGULATOR.

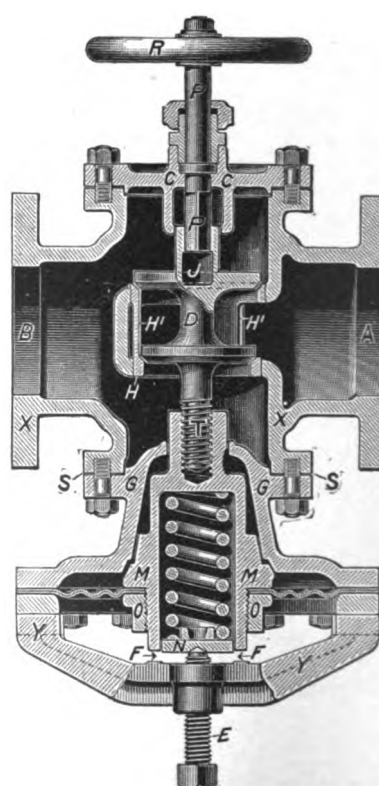
SCREWED

FIGURE 1153.



FLANGED.

FIGURE 1154.



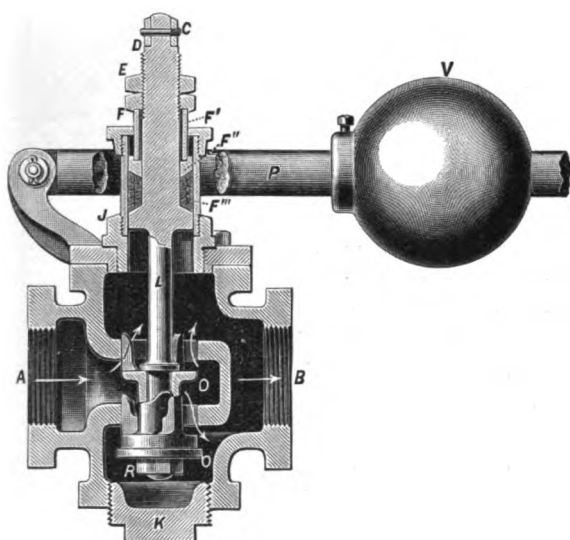
For Regulating
Pressures of Steam, Water,
Gas and Air

REDUCING VALVES AND STEAM TRAPS.

FOSTER'S PATENT REDUCING VALVES.

SINGLE LEVER.

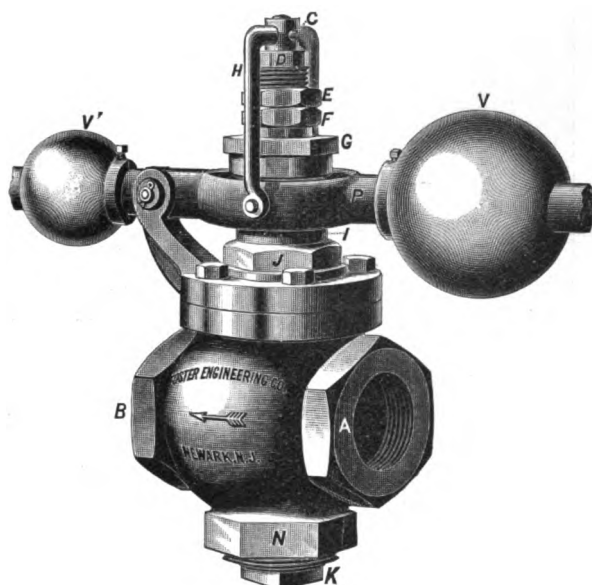
FIGURE 1155.



For delivery pressure from 10 to 100 pounds.

DOUBLE LEVER.

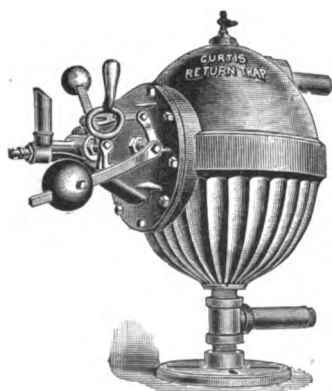
FIGURE 1156.



For very low delivery pressure, from 0 to 10 pounds.

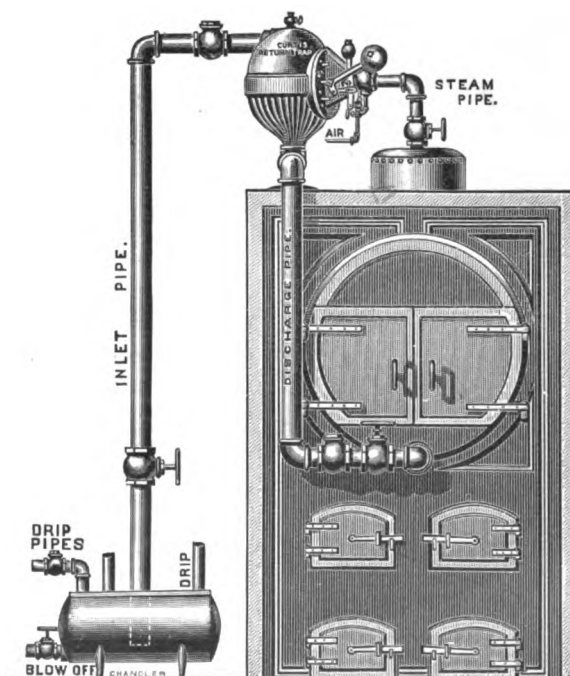
CURTIS PATENT RETURN STEAM TRAP.

FIGURE 1160.



CONNECTED TO BOILER.

FIGURE 1160 A.



This TRAP takes the water from the condensing surface, and returns it into the boiler at a temperature always above 212 degrees, and will effect a saving of 20 per cent. in fuel. It works automatically, returns pure distilled water, and is useful wherever steam is condensed under pressure. The trap is placed perpendicularly near the boiler, the bottom of the trap at least two feet above the water line. The outlet pipe leads into the boiler below the water line, with Neary check and globe valves near the boiler. The water inlet is connected to the receiver, with a globe valve and Neary check valve near the receiver.

TABLE

OF SOME OF THE LENGTHS AND WEIGHTS MENTIONED IN THIS
CATALOGUE, AND THEIR APPROXIMATE EQUIVALENTS
IN THE METRIC SYSTEM.

LENGTH.

1 Metre.....	equals	39.37	Inches.
1 "	"	3.3	Feet.
1 Inch.....	"	25.4	Centimetres.
1 Foot (twelve inches).....	"	30.48	"
2 Inches (page 7).....	"	5.	"
4 "	"	10.	"
8 "	"	20.	"
12 "	"	30.48	"
16 "	"	40.	"
20 "	"	50.	"
4 Feet	"	1.22	Metres.
8 "	"	2.438	"
12 "	"	3.658	"
16 "	"	4.877	"
20 "	"	6.096	"
24 "	"	7.315	"
30 "	"	9.144	"
72 "	"	21.9456	"

The derricks (figures 1 and 9) are 20 feet (6 metres) square at the base, and 72 feet (22 metres) high.

WEIGHT.

1 Pound.....	equals	453.592 Grammes	equals	0.4536	Kilogramme.
1 Gramme.....	"		"	0.03527	Ounce.
100 Pounds.....	"		"	45.36	Kilogrammes.
1 Kilogramme	"		"	2.2046	Pounds.
25 Pounds (page 7).....	"		"	11.34	Kilogrammes.
100 "	"		"	45.36	"

The weight of an average set of tools is about 2,500 pounds or 1,134 kilogrammes.

The diameter of an oil well is generally 5½ inches (14 centimetres).

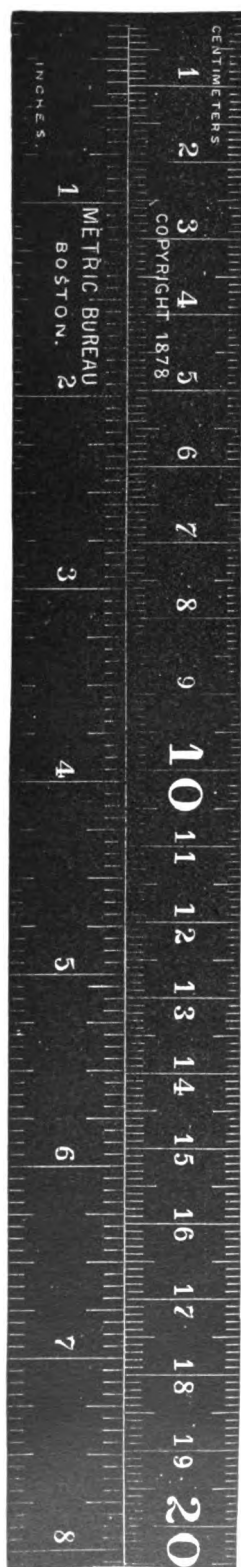
A shallow well is less than 600 feet (183 metres) deep.

A deep well is over 2,000 feet (610 metres) deep.

43 x 21 feet on page 11 equals 13 x 6 metres.

82 feet (height of derrick on page 12, Fig. 9 A, equals 25 metres.

Weight of portable rig, page 22, about two tons=4,000=1814 Kilogrammes.



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